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Russian River Watershed Protection Committee

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Notes & Questions on SR Subregional Long-Term Wastewater Project EIR
Submitted October 7, 1996
(Hand delivered)

Introductory Comments

These comments are being submitted in conjunction with the comments of Marion Moses, M.D. and John Rosenblum, PhD. Together they comprise the comments of Russian River Watershed Protection Committee. I am also including comments written for the EIR Hearing held on Sept. 24, 1996. 001a

We are concerned that the issue of cost may have already prejudiced decision makers. (See article on 10-6-96 in Press Democrat, enclosed) This whole exercise has produced an unfair cost disadvantage to the river option; it has been made to look far less expensive to decision makers in comparison to other options. The Press Democrat, in article after article over the last several years has emphasized the issue of cost; always to the disadvantage of river discharge. Unfair comparisons have shown irrigation and reuse options to be much more expensive by sizing reservoirs to hold one billion gallons or more. 001b

Many probable future costs for river discharge, such as compliance with more stringent standards, have avoided consideration and thereby cost analysis. 002

We challenge the decision makers (City Council and Board of Public Utilities members) to read this *entire* document and all the comments and replies **before** they make a decision. Who of them would be willing to sign an affidavit assuring that they have read the entire set of documents? Reading the first three volumes alone gives a very limited view of the problems of this work; it asks the reader to take on faith that the analysis of impacts is correct. This is inadequate for making a decision since the meat of the document (ie. all backup information) is in the studies. The comments and response to comments form an integral part as well. 003

While other river people will get into this issue in more detail, this document virtually ignores impacts to Russian River businesses and the tourist and fishing industries. 004 005 There has been no studies of how tourism will be affected. Hundreds of people each year ask river business people if the river is safe. Some of them have gotten sick swimming in the river (no analysis of swimmers here either) and you can bet they will tell their friends and not come back. Businesses have had cancellations because of health concerns about the water. Increased discharges will exacerbate the situation greatly and this document ignores that fact. 006 007 008

Information in this document was presented in a very disjointed and repetitive manner. The first three volumes form the actual EIR and are organized by impact rather than project, making it impossible to track a single project through from start to finish. 009

Because this was assembled by a many headed beast, there is a great deal of repetition. Many graphs are repeated numerous times and a great deal of information appears again and again in similar and slightly different forms, having been done over and over again by different people. 010 Much of the water quality data was replicated in many different sections. 011 The fish migration study for 1991-1994 has a great deal of material copied *word for word* in the 1991-95 study. This makes it very disconcerting for impact assessment. 012 The maps were of poor quality and difficult to read. 013

Sixty days was not nearly enough time to do justice to analyzing this document. We attempt to bring up all of the critical issues but often not in the detail we would have liked. We needed more time to consult with experts; some were simply not available to us in the time we were allowed. There are many numbers and calculations that we wanted to cross check but there simply wasn't time; the lack of good organization of the information made the process more difficult and time consuming. Furthermore, the CD ROM was difficult to utilize; many had a difficult time with it. RRWPC ended up paying over $500 for a partial hard copy of this EIR. The price of the total document was prohibitive. We know some agencies and groups received free copies. Who received free copies of this document? The Sonoma County Water Agency just came out with a 6 volume EIR at a total cost of $93 and they are giving 85 days for review. 014 015 016 017

It is most disturbing that this document assumes that for the most part the only risks are those that appear in the regulations and have somehow been quantified by the EPA and regulated by the State Board. These agencies are just beginning to recognize the threat posed by environmental estrogens (effects to the reproductive, nervous, immune and most other systems). How can responsible people ignore the evidence presented by Theo Colborn in her book, *Our Stolen Future* (copy submitted with these comments) and comments provided us by Dr. Marion Moses? While a report on the estrogenic effect appears in this EIR, nevertheless these elements are disregarded in the risk assessments analyses and cumulative effects. 018

Most of the data presented in this document is presented in the form of averages. But life doesn't present itself in averages and it is the extremes that are filled with danger. 019

We are further concerned that the real risks are not even being considered in these extensive analyses. Quoting from *Our Stolen Future*, p.253, *"The patterns of effects vary among species and among compounds. Four general points can nonetheless be made: (1) the chemicals of concern may have entirely different effects on the embryo, fetus, or perinatal organism than the adult; (2) the effects are most often manifested in offspring, not in the exposed parent, (3) the timing of exposure in the developing organism is crucial in determining its character and future potential; and (4) although critical exposure occurs during embryonic development, obvious manifestations may not occur until maturity."* 020

We have concerns about the setting in which the data was collected. We know of many personnel problems in the Subregional Lab and know for quite a time a psychologist was on board to assist with problems. We are submitting a report by Sue Kramer on July 11, 1994, indicating some of the ongoing difficulties. What precautions were taken to assure that all test results were accurate under these circumstances? Were results double checked? What kind of oversight was available to assure accuracy? How do we know that the whole basis for this $12 million dollar study is not faulty? 021

Furthermore, it is of significant note that while risk assessments consider the sensitivities of children, they fail to consider impacts of chemical exposure to fetuses at critical points of development. They gloss over effects of toxins on those with compromised immune systems and the elderly for both human and animal studies. There is no recognition of differences of male and female bodies in their capability of absorbing and processing toxins. There is no discussion of the bioaccumulation of toxins in our bodies that probably contributes to high rates of prostate and breast cancer in older people. 022

Vol. IV
D-1: Final Demographic Data
Table 1

1. Data is given for 1980, 1990, 1995, etc. Does the basis for pre 1995 data reflect additions to the sphere of influence since 1994? In other words do population numbers in 1980 and 1990 reflect the exact same sphere of influence as 1995? How did Rohnert Park and Cotati calculate their persons per household numbers? 023

D-2: Comparison of ABAG projections & build out estimates 024

1. Pg. 3 "Capacity would increase from 18 mgd to 21 mgd average dry weather flow." Does 21 mgd capacity carry throughout the document?
2. How much influence do ABAG numbers have in determining capacity? Why are ABAG's numbers so close for Sebastopol and SR and so far off (up for RP and down for Cotati) on the others? 025 026
3. The document states that growth is far less for the project than the county and therefore is not growth inducing, but the numbers cited don't make sense. (i.e. Population increase is listed as 5790. This does not jive with numbers in D-4.) Also, this statement about growth inducement does not seem to flow clearly from the general discussion on whether to use ABAG projections. 027 028

D-3: Water Conservation 029

1. Conservation assumptions do not include an analysis of possible water savings from a tiered system of water charges to the consumer. What would be the savings (leaving all other water saving assumptions intact) of water usage to the system and cost savings to the ratepayer if there were a four tier cost basis for both residential and commercial users? Please reanalyze this section using the assumption that the greater the cost of higher water use, the more public habits would change and further conservation could be realized. In turn, please analyze consequent lower system costs for all project alternatives. 030
2. It is our recommendation that the fourth tier represent a percentage of significantly higher rates which could kick in only during periods of draught. This could serve as an additional buffer for irrigation and reuse alternatives. 031

D-4: Wastewater Flow Projections 032

1. This section repeats much of what is in previous sections. Feels disjointed and disconnected from D-1 through 3.
2. Please explain why students use about 20 gpd and ordinary citizens use about 80.5 (based on 1994 generation factor of 192.3 gpd per du divided by 2.39 persons in each SR household.) This seems out of balance. (Page 4-3) 033
3. 1986 to 1994 Ch2MHill assumed 73-75 gpd per person in sizing facilities. Please explain the 7.5 gpd per person increase. Also, this is an apparent contradiction with this EIR document's assertion that the gallons per person rate has gone down (because of conservation). Where does the discrepancy come from? The 1995 Report of Waste Discharge, prepared by CH2MHill stated (p.6 on subregional system capacity) *"Prior to implementation of water conservation mandates, typical wastewater generation rates were 75 gpd per person and 2.5 persons per unit (187.5 gpd/unit). Assuming a 15% reduction in wastewater generation rates...allows for some deterioration in performance of the retrofit devices over time. This conservative 15% reduction lowers the typical wastewater generation rate to 160 gpd/unit (64 gpd/person). The wastewater generation rate of 160 gpd is also applied to new residential construction."* 034
4. What is SR's commodity rate structure? Why is there no description? Please analyze current cost savings with that structure (over a single rate system). Please compare this to a four tiered system as mentioned above in terms of savings to the consumer as well as cost savings of irrigation and reuse alternatives? (pg. 4-5) 035 036
5. If SCWA's conservation program were successful, why would they need to develop a plan to increase their diversions by about 100%? 037

Are their any statistics to quantify the success of SCWA conservation programs? 038

6. Table 4.3-2 claims that residential flow generation *without* conservation (i.e. conditions that existed prior to the current conservation program which began about 6-8 years ago) comes to 215 gpd. This is totally out of line with the CH2MHill estimate of about 180 gpd around 1986 when the first EIR was being developed. Where did the 215 gpd come from? When that number was calculated what assumptions were included? If actual flow was the basis for the amount, how was infiltration and inflow calculated in the equation? Precisely how was the gallon usage per day calculated? (Please give example.) 039

7. Please compare winter bills of consumers showing most likely actual household water use to summer influent generation to determine how much infiltration and inflow is happening. 040 Then show how I&I repairs can decrease flows significantly and allow for cost savings and downsizing of the system. 041

8. Are winter bills of consumers representing actual household usage comparable with actual summer flow generation which eliminates infiltration and inflow? 042

9. In Table 4.3-12, what is meant by conservation pricing and how does Santa Rosa's limited program qualify as being in full compliance with Best Management Practices? 043

D-6: Elimination of Alternatives 044

1. The following statement needs explanation: "Discharge to the Russian River is also evaluated as an opportunity to enhance riparian areas both in the river and along the Laguna de Santa Rosa, by increasing wetted area during low flow conditions." Which riparian areas? 045 Define Laguna flows. 046 What is meant by low flow? 047 Do you anticipate a summer discharge? 048 How would October and November discharges during possible low flow periods help riparian vegetation during a time when plants are beginning to go dormant? Could it have a negative effect?

2. Santa Rosa provided for a great deal of public input but did not follow it when it was given. Alternative 2M received the most support from all public members and was eliminated for consideration by SR because it called for increased urban irrigation and *maximum* conservation. 049 SR has a long history of not following recommendations of citizen committees. Further, the City stopped having meetings of its Technical Review Group when the environmental member began asking too many questions. (p.8) 050

3. In terms of *maximum conservation*, we wonder why SR was not willing to include a multiple tiered fee system for water charges. It is a well known fact that charging more for higher water use is the best conservation motivater. We do not agree that alternative technologies for conservation to do provide a reliable means to do so. (p.10) 051

4. Why are double plumbing and manufacturing reuse not mentioned and analyzed? (p.11) 052

5. Page 16 is missing from my copy and Lake Sonoma discharge analysis is missing. 053

6. It would probably be more honest to say that rapid infiltration was eliminated because the SCWA, North Marin Water Agency and several water experts were vehemently opposed to this alternative. I have been told they are just as adamantly opposed to a direct river discharge. 054 Why were logistics determined adequate in 1988 and they are not adequate now? (p.18) 055

7. The current system has 1.5 billion gallons of storage. For a 1% discharge option, why is 4 billion gallons more of storage needed to accommodate 3 million gallons a day additional capacity? 056

8. Do cost figures for on-farm storage ponds incorporate loans and grants available to farmers to finance such ponds? 057 Also, are cost savings from a phased project factored in? (p.20) 058

9. In the discussion of ASR, it appears that it is *reasoned* that because ASR does *not* have the impacts of a groundwater recharge, it cannot be regarded as a known technology and is therefore dropped. It appears to us that ASR would have way *less* impact than groundwater recharge, and the logic of this reasoning evades us. Please explain. (p.22) 059

10. In regard to the Regional Boards aggressive schedule for completing selection of a long term project, we must mention it's been delayed nine times. The original intent of the long term project (ordered eleven years ago) was to get discharges out of the river, and now this document argues that the time line is the basis for *hurrying* the process! So the solution is to discharge 20%! So much for logic! (p.22) 060

11. In regard to pond size limitations: Delta Pond holds 650 mg yet the smallest pond studied for this project was 1,000 mg. It seems that looking at phasing in ponds of 400 to 800 mg could have resulted in considerable cost savings and would have been much more politically acceptable and may have avoided litigation. 061

12. Why was there no analysis of the 50 sites identified in the Koretsky King report of 1980? 062

13. The report keeps saying that multiple smaller reservoirs are cost prohibitive. Do cost analyses take into account the savings from project phasing? 063

064

D-8: Water Balance Model

1. It should be noted that the manner for determining river discharge rates has never been incorporated into the NPDES permit, has never been subjected to a public hearing, and is currently subject of a lawsuit. The description on page 3 is 065 inadequate and does not reflect *actual* circumstances. What is the difference between *allowable* and *actual* discharges? What is the definition for 1%, 5%, 10%, etc. and 066 how these discharges are determined? Also, where are these percentages calculated?

2. Does this model consider the fact that discharges are currently based on flows taken at the Hacienda Bridge, which is downstream of SR's discharge? How are these accounted for by the model? (p.4) 067

3. The monthly model is designed to allow greater flexibility in SR's storage management. Yet how does this correspond to *actual* discharge percentages at the point of confluence with the Laguna and Russian River? What are all the *actual* percentages, on a *daily* basis, of various discharges and all of the various daily and cumulative impacts of these discharges? In other words, if the 1% becomes 10% *at times (ie., Is the 1% based on the high flow of the day before as measured at Hacienda and averaged over a seven day basis? If so, actual discharges can be much higher than 1%.)*, under what circumstances will this happen, how often, and what impacts will result? (p.5) 068

4. Also, storage needs can increase depending on the method of discharge. This analysis is critical to the results of the model and is not adequately explained. 069

5. Are all the people working on this model familiar with the *real* Russian River? There is a level of detachment here that feels like science fiction! 070

071

D-9: Results from daily & monthly water balance models

1. What is the reason for looking at monthly averages? Most impacts occur to the river during extreme circumstances. Averages flatten out those numbers and appear to modify the extreme. But nature does not average; it gives and it takes away. The actual river can go down as much as 23,000 cfs (average may be about 4-5,000 cfs) in a single day as it did on Jan. 4, 1993. This converts to about 14.7 billion gallons in one day. Where are the numbers showing all the impacts if SR bases a discharge on 072 the flows of the day before and the actual discharge socks the river with a much higher discharge than the one allowed at *any* discharge rate?

2. This memo appears to indicate that monthly averages are similar to daily water balances most, but not all of the time. Are consultants attempting to show by this analysis ways to avoid constructing storage facilities for all weather scenarios? What is the true intent of this exercise? 073
3. 10% and 20% scenarios indicate significant discharge exceedances in their discharge rate under all model operation scenarios. Various different contingencies are provided but what are the odds on an illegal discharge at those times? 074

D-10: Water balance contingency plan 075

1. In describing contingency events as being uniquely different and at times having major impacts that are not easily planned for, we wonder why major conservation efforts would not be a very attractive alternative. It seems that maximum conservation would provide as much certainty as these 5% contingency events. (p.3)
2. It seems as though this model relies on averages over a 70 year period to substantiate the validity of its conclusions. It is precisely the uniqueness of each event that produces major irreversible impacts such as erosion, large scale contamination, breakdown of the treatment system and consequent environmental degradation. 076
3. Please describe emergency conservation contingency measures. How would these be effected? What rates would be implemented and for how long? How would people be notified that they going into effect? (p.8) 077
4. Does Table 6 (p.10) imply that the City will allow illegal discharges as their contingency? Please explain the additional river discharges as contingencies. How are contingencies affected if monthly averages are not allowed and only daily averages were allowed? 078
5. Table 7 seems to acknowledge that illegal discharges would occur. (p.11)
6. Does this document consider all of the impacts of increased discharge in the fall when the river may still be quite low, a contingency favored by the model analysis? This analysis is contrived to favor the needs of the system and fails to consider such things as the impact on tourism in October. Please correct us if we are wrong. (p.13) 079
7. The charts, Figures 1-8 are based on average volumes per month. The river can go up or down by thousands of gallons in a day. How do these *monthly averages* impact the *actual* river during individual unique events? Please give some examples during very low flow and very high flow periods. 080

Vol. VII 081

G-1: Potential Flood Impacts

1. The goal of this section is to show flooding impacts of the project. Only wastewater discharges are considered however. The whole point of this entire project is to allow for fulfillment of general plan goals to accommodate increased development. Population in the study area would increase by about 40,000 people by 2020. This represents about 15,000 new dwelling units. Please show the incremental increase in runoff adding to Russian River flooding by those 15,000 units through the covering of pervious surfaces which could not be built without this project.
2. The analysis in this section does not address cumulative flooding impacts; it only addresses one point of impact in relation to the peak flow. What happens when the flows back up? Do discharges stop? It appears as though Meadowlane is in the hundred year flood plain. How do various flood levels affect this discharge? (pg. 2) 082 083
3. This report minimizes the increase the flood levels by saying the level would only increase by .01 feet. This is over an inch. Please elucidate the amount of damage that could occur if one were to get one inch of flood water in one's dwelling. This report does not even consider incremental increases from other project related increases such as increased runoff and cumulative impacts from development in other project areas such as Windsor. (p.3) 084 085

4. Santa Rosa irrigates about 4 billion gallons a year in the Laguna area. This irrigation carries into the fall if the season is warm. When the soil is thus saturated, what happens to its capacity to hold water? Then when early winter comes and major storms occur the ground is already saturated. How do these high saturation levels affect erosion and ultimately add to cumulatively higher flows of the Russian River ? 086

G-2: Potential Streambank Erosion 087

1. This section does not address whether a given discharge over time will cause streambank erosion. Why was the element of time not considered?
2. Does the clarity of the water cause variations in carrying power? Would heavier water, already filled with sediments tend to carry more sediments with it? How does volume and velocity interact to cause more dramatic erosion? Do high water tables and super saturated soils combine to effect erosion as well? Does summer saturation of slopes with wastewater irrigation impact the amount of erosion? How does this get compounded when late irrigation saturates soils and then a heavy rain saturates them further? Is there a weakening of the banks from sources other than stream flow? As the soils get saturated from all sides, they weaken and then the force of water can have a much greater eroding effect. Have all these factors been analyzed? So to what extent would the addition of more wastewater accelerate the erosion process if all these factors are considered? 088 089 090 091 092 093
3. How is streambank erosion defined? What does *erosion* consist of? Does it include the entire upper and lower banks? If so, why were sediment samples only taken of the river bottom? Does streamflow velocity affect the banks the same as the bottoms? (pg. 3) 094 095 096 097
4. How close to the 100 year flood event was the high water year of 1982? Is this truly representative of potential high water events in the Laguna? 098
5. Where is the dividing line between upper and lower reaches? (p.3) 099
6. Are the banks of the same material as the bottoms? Is it fairly assumed that the banks would erode at the same rate? 100
7. Actual flow data is not available for the Laguna. How are computerized *estimates* for Laguna stream flow established? Why is there no flow gauges on the Laguna? 101
8. Is lack of riparian vegetation a factor in erosion capability? Why is no description of riparian vegetation given? 102 103
9. This analysis is based on averages. What is the entire range of factors in relation to one another? How many special circumstances will occur when the erosion will increase? How will this interface with salmonid migration? 104 105
10. Analysis of erosion potential was based on conditions in 1982 and earlier. For the last two or three years however, the river has been exhibiting much greater turbidity for much longer periods after storm events. What conditions have changed since then? Also, 1995 was a very wet year; wouldn't it be more appropriate to use data from that period? 106

H-2: Reclaimed Water Quality 107

1. Were all test results from Santa Rosa's lab? Were any of the results cross verified with other independent labs? Were results compared to Regional Board tests? How long was a psychologist & consultant on board to assist with emotional problems among lab workers? How can we be assured that these difficulties (see Sue Kramer's report of July 11, 1994) did not affect the quality of testing in the lab? 108
2. What are trip/field blanks? (p.4) 109
3. Marc Lappe, health professional and toxics expert offered the following comments on Table 1 & 2 (pp.-10): 110
4. Lead levels appear quite high with the mean at 0.0045 and .005 ppb a level of concern for human health. Whether many of the values were actually nondetect 111

doesn't remove the concern that 25% of the samples were above the detection limit. 111 (cont.)
There is a need for more detailed analysis.

5. Nitrate levels are quite high and show up in all samples. Nitrate is a carcinogen and causes blue baby syndrome. This is cause for concern. Point of significance should be included because of danger. 112

6. Phthalates are carcinogens and xenoestrogens. This means the damage they can do is extensive both to humans and wildlife. Safe levels of total phthalates should be below .003 (mean concentration 0.00558) 113

7. Aldicarb is such a high risk pesticides that more than four samples are needed. 114
Similarly, with cryptosporidium and other biological pathogens of such concern, four nondetect samples are not nearly enough to provide assurance of safety. 115

8. Heptachlor was seen only once but it is an extremely nasty chemical and banned from use. This should be monitored closely. 116

9. Asbestos was high yet only four samples were taken. Cyanide jumps off the page as being too high. Similarly dissolved silver is too high (not enough samples here either- eight samples in eight years) 117 118

10. Dr. Lappe concluded that wastes must be leaching from electroplating, electric, and/or photo processing industries to cause the range of contamination's that are showing up (i.e., silver, cyanide, phthalates, asbestos, lead, etc.) 119

11. Over the eight year period for all constituents, were any numbers left out of this data summary? Please explain the unequal number of samples taken for the various constituents. Over an eight year period there should have been at least four samples a year for most constituents which would give at least 32 values for each constituent 120

12. Arsenic and aluminum also show up too frequently at borderline high amounts. What are the levels of these constituents at point of discharge? 121

13. According to a recent scientific article, ***A Global Decline in Microbiological Safety of Water: A Call for Action,*** (by the American Academy of Microbiology) it was stated that *"There is growing concern about the general failure of authorities to understand the public health and associated socio-economic impact of waterborne and related infectious diseases....it was clear that the distribution of safe water to the home can no longer be taken for granted, not even in the United States or Western Europe." It also states, "New methods of desalination and wastewater reuse provide a major growth area for the future...for irrigation-based agriculture, and for drought-stricken regions. A note of caution, however, is that the fate and pathway of pathogens within such systems are not fully understood, especially helminth eggs, viruses, and protozoa. Epidemiological studies will have to be done before these methods are applied on a mass scale. Acceptability of reuse depends to a large extent on confirmed microbial safety of the reused water and/or the agricultural product." How can Santa Rosa assure people their wastewater is safe in light of these issues?* 122

14. Cryptosporidium is not only found in wastewater but is frequently found in cow waste. Does dairy waste finding its way into the Laguna as a result of over irrigation? Can over irrigation spread these pathogens around and speed its movement to the lower river? How can we be sure cryptosporidium will not enter a drinking water supply or affect swimmers? What is the fate of cryptosporidium in the sediments? Can this parasite find its way to the lower river, become embedded in the sediments and infect swimmers in the summer time? 123 124 125

H-3: Water Quality Update 126

1. Analysis on p.5 on copper does not jive with Table 2. Copper levels went up in 1995-96 from 0.012 to 0.013. While it is possible that the last two readings were down, nevertheless results must mean that other readings were up. At this time we cannot conclude that copper levels are safe.

2. Please explain Table 1 (p.4) lack of data for constituents previously found at detectable levels. Why the omission in testing? What are future plans in this regard? 127
3. In this section you compare data for one year (1995-96) to eight years worth of data. What is the statistical validity of doing that? Further, it is suspect that you do not do this for all constituents. Is something being hidden? Also, why not show the range of data samplings as in the previous section rather than just the average? 128
4. Why are some chart columns labeled with mean concentration and some with averages (having the same numbers)? Are these the same thing? 129
5. Why are values for ND sometimes given and sometimes not given? 130
6. It is very reassuring that cryptosporidium and giardia increases can be attributed to a 6 month filter breakdown. (And the public was not informed!) It seems as though there have been other filter breakdowns in the past. And what is to assure they will not break down in the future? Further, not enough data has been collected (only four samples prior to 1995) to indicate a trend. Since these cysts are more prevalent at some times of the year than others could that be a factor in the data results? 131 132
7. It is a severe deficiency of the toxicity studies that effects were only studied at 100% and 50% since Delta discharge will often be at 70-90% of Santa Rosa Creek flow. Do we assume that if there is an effect at 100% and no effect at 50% that 70-90% will or will not have effects? 133

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I-12: Evaluation Criteria for potential water quality impacts

1. What is an impact? Does an impact occur ONLY when there is an enforceable numeric criteria in effect? Are only those regulatory requirements in effect at the time of this document's publication the only ones that count? What happens when the regulations change, before Santa Rosa obtains its increased discharge permit? In light of potential changing regulations on many (most?) of the chemicals listed in this section, what is the long range prognosis for Santa Rosa's ability to retain usage of the Laguna and Russian River as its wastewater dumping station?
2. Recent scientific studies have indicated that impacts of pollutants can be magnified a thousand fold when they combine synergystically. (See article in *Science*) What assurances can Santa Rosa make that the chemicals found in their wastewater will not enter the drinking water supply? What potential harm to aquatic life may occur? 135 136
   What monitoring will be done for these chemicals (i.e. from Table 1 in this section) at the point of discharge? At each of the downriver water intakes? What opportunities for infiltration in wells along the Laguna may occur? What monitoring has occurred in those wells for these various constituents? What monitoring is done by the various different water suppliers on the river? 137 138 139 140 141
3. *Science Magazine* of June 7, 1996 printed the paper, *"Synergistic Activation of Estrogen Receptor with Combinations of Environmental Chemicals"*. The introduction states, *"Certain chemicals in the environment are estrogenic. The low potencies of these compounds, when studied singly, suggest that they may have little effect on biological systems. The estrogenic potencies of combinations of such chemicals were screened in a simple yeast estrogen system...containing human estrogen receptor....Combinations of two weak environmental estrogens, such as dieldrin, endosulfan, or toxaphene, were 1000 times as potent in hER-mediated transactivation as any chemical alone. Hydroxylated polychlorinated biphenyls shown previously to synergistically alter sexual development in turtles also synergized in the YES. The synergistic interaction of chemical mixtures with the estrogen receptor may have profound environmental implications. These results may represent a previously uncharacterized level of regulation of estrogen-associated responses."* 142

4. The implications of this discovery are profound. In order to obtain a permit to discharge above 1%, Santa Rosa will need to convince the State and Regional Boards that the above new information is insignificant and unimportant and does not constitute backsliding from their permit. How will this limited discussion (current regulations only) serve Santa Rosa under those circumstances? 143

5. Regulations on cryptosporidium, dioxins, trihalomethanes, etc. are very much in flux at this time. EPA is promulgating numeric standards for California. Are the standards presented in this document the ones that are being proposed or have been in place? How can the authors of this document declare that the only impacts are ones that are currently regulated when regulations are changing frequently? 144

6. Most of the constituents in Table 1 (pp. 4-7) for which numeric standards have been promulgated do not appear in Table 1 (pp. 7-10 in H-2). Why? Why not also show Santa Rosa's monitoring results in relation to the standards? Further, if EPA guidelines represent the supposed *safe* level of exposure, is this the level Santa Rosa intends to meet? If not, why not? (Please explain each of the constituents on this chart for which no results have been presented on Santa Rosa's wastewater.) 145

7. Why not use the same units of measurement for all charts? It is confusing to switch from ug/l to mg/l, etc. 146

8. Which waters in the lower river have been designated cold and which warm? What was the basis for that decision? How will the proposed listing of the steelhead affect those categories? 147 148 149

9. The quality of Santa Rosa's effluent is highly variable according to a statement on p.40. The statement is made, "However, since the effluent is stored in ponds prior to discharge, the variation is low, and will be in the future, dampened substantially." What do the last two words mean here? Please be very specific in terms of the regulated and to be regulated constituents. Does this statement also mean that the City relies on the ponds as part of the treatment process? What standards and monitoring will be applied to the point of discharge? What is the fate of all these variable constituents in the summer time when the wastewater is irrigated, especially the ones that do not volitilize? 150 151 152 153

10. By eliminating consideration of peak constituent concentrations over an hourly period is this also eliminating possible documentation of acute exposures to pollutants? How will you even know when peak exposures occur? What possible impacts are being eliminated by eliminating consideration of peak exposures? What are the impacts on aquatic life in the ponds and immediately downstream from the discharges from peak exposures? Also, it seems that some constituents would be more deadly than others. Which constituents would be of greatest concern for peak concentrations? Shouldn't those be tracked? What are the possible impacts to all of the various species that inhabit the Laguna? Can all organisms tolerate (what does that word mean?) peak constituent exposure all exposures to a similar degree? Please differentiate. (p.41) 154 155 156

11. How are narrative regulations enforced? What monitoring occurs? There are plenty of foul smelling and tasting fish in the Laguna and Russian River. What is done about that? I've been told the bottom sediments are foul smelling; what is done about that? How does Regional Board staff know if undesirable smells or tastes occur? Since undesirable is a subjective term, how is this enforced? Also, foam is frequently seen on the Russian River. Does foam ever occur at the point of discharge? Where does the river foam come from? (p. 43) 157 158 159 160

12. In regard to biostimulatory substances, why is there no reference to chlorophyll samples taken by the City? According to the Report of Waste Discharge for 1995, Chlorophyll was monitored monthly (Tables B-2 and B-3) Has this consultant substituted computerized *estimates* for the actual data? How are estimates modeled? Where are the actual samples? How do you compare an estimate to existing conditions? (p.58) 161

13. Many of the discharges to Santa Rosa Creek have been noted at 70-90% wastewater. Flow data for the Laguna is available (I have been told) for only a very limited time. For toxicity data there is this giant gap between 50% dilution and 100% dilution. What is really meant by *lowest* effect? How is *effect* defined? What happens when an effect occurs? If you don't have flow data upstream and downstream of the discharge, how will you know what percent of dilution you have? This also seem to imply that you have a static toxicity level. What if the level changes? What kind of ongoing monitoring will occur with toxicity testing? What happens when there is an accumulation of toxins? How will you assess the toxicity of Santa Rosa's effluent in conjunction with other discharges and also with urban runoff? 162 163 164 165 166

14. How did the Regional Board determine that 159,000 lbs. reduction was going to help water quality in the Laguna? Is this amount likely to change if that tmdl doesn't achieve a goal of higher water quality in the Laguna? How might a higher tmdl standard affect a 5%, 10%, 15%, and/or 20% discharge? What will be the process for determining the effects/benefits of the current tmdl goal? (p.61) Where will the load reduction be measured: in the ponds, at the point of discharge or at the plant? Please justify the selection. 167 168 169

15. Many chemical constituents were eliminated from further analysis of impacts. Ostensibly these chemicals did not show up in Santa Rosa's wastewater. How many samples were taken over the last ten years for each constituent? (Please name individually.) Precisely where were those samples taken? Were any taken at the point of discharge? What tests and labs were used to run these tests? What was the point of detection for each of the tests? Did this point of detection reflect the lowest possible number that is technologically feasible for the constituent? 170 171 172 173

16. Do all chemical constituents in table 4 correspond to the Quarterly Monitored Priority Pollutants? 174

I-13: Sediment Quality characterization 175

1. Why were sediment samples only taken and analyzed for one day? How can this be considered an adequate sampling from which conclusions may be drawn? Doesn't the city have earlier sediment sampling from Delta and Kelly ponds? Why weren't these used as a basis for comparison? Why were downstream of discharge samples taken at Trenton-Healdsburg, the site of Windsor's discharge? What possibility is there that their discharge affected the results? (p.4) 176 177

2. By showing the numbers in grams does accommodate the psychological effect of smaller numbers? Would 1.5 ug/g actually be 15ug/mg? It's unclear why grams are being used rather than milligrams. Please explain. 178

3. There is almost no writing on p.13 in my copy. What is missing? 179

4. Were the detection limits used in these studies based on the best technology available; could the use of other technologies lowered the detection limit? 180

5. On page 10-17 there is a report of heavy metals using first SAE methods and then WAE methods for about six stations in the upper and lower Laguna and the Russian River. These numbers seem to be quite different from the ones presented in Section 4.6 page 29 (Surface Water Quality). For instance, in the latter report Cadmium is 0.06 (mg/kg) in the Laguna above Santa Rosa Creek and 0.06 below. The sediments report gave SAE Meadowlane Pond as 0.39 ug/g and 0.11 ug/g at Trenton-Healdsburg Rd. (Why can't all measurements be in mg or ug and not mixed?) The WAE for cadmium was non-detect at both Laguna stations. Similarly copper was 6.6 mg/kg upstream and 13.0 mg/kg downstream in Water Quality report and Sediments report stated that WAE copper upstream was non detect and higher (no number given) below the discharge in Santa Rosa Creek. (Figure 4 graph shows between 1.0 to 2.0 ug/cm. Please explain these discrepancies. Also explain the 181 182 181(cont.) 183

statement that is made on p.29 that, *"However, the concentration of copper has not increased in the reclaimed water since routine collections were begun in 1998."* 183 (cont.)

6. Why were the bacteriological samples collected and mentioned but not reported? 184
Were sample also taken in the wastewater ponds? 185

7. Generally it appears as though there has been a significant accumulation of heavy metals in the sediments affected by wastewater. I anticipate an analysis of how this situation affects biotic life. 186

I-16: Water Quality Impact Report: Text 187

1. Please analyze the degree to which any of the constituents mentioned in this section are likely to change, both in frequency and amounts, due to the increase in industry and population this EIR accommodates and due to increased discharges. It appears as though all analysis is based on current chemical contributions to the wastestream. Where is the analysis of how this will change with increased flows?

2. Are constituents the same as criteria? (p.7) Of the 60 *criteria* that were dropped, what was the exact basis for doing so? How many non-detects were obtained over how long a period to justify dropping them? 188 Were these constituents tested for in sediments? 189 What is the likelihood they might occur in sediments? 190 Is there no need to project their future occurrence in sediments and wastewater if increased discharges are to occur? If not, why not?

3. In Table 3-1 does the point of significance represent water or sediment quality? 191 Why have these not been separated out? 192 What is the interaction of water and sediment for the various constituents? 193

4. Of the constituents dropped for being nondetectable, how long and how frequently were they tested? (p.18) 194

5. How can you determine the significance of an impact if you do not look at the being that is impacted? Current regulation is not only woefully inadequate, it is ages away from what the edge of science is telling us about the impacts of chemical toxins. Furthermore, there are criteria in the process of being developed and/or changed. Can you identify all of the probable uncertainties with present regulations in regard to specific constituents (i.e., cryptosporidium, viruses, copper, lead, asbestos, cyanide, silver, etc.) 195

6. Heptachlor is banned and yet it appeared in Santa Rosa's wastewater. Since banned substances are usually the most dangerous, how can you assume it will not pose a threat, especially when it is not banned in other countries and may be brought in illegally? (p.18) 196

7. Nondetectable measurements do not mean that the substance is not present. In light of new information that minute amounts of estrogenic chemicals can synergistically interact, how can you justify elimination of these chemicals as having no impact? This is a problem that is going to have enormous impacts before science finds a way to further define it. 197 Which of the chemicals that you have eliminated from study behave as xenoestrogens? 198

8. You have removed pH from consideration because the *average* is within the guidelines. Yet it is the extreme measures, gobbled up by the average, that can cause the greatest impact. At the very minimum, please discuss past exceedances and potential impacts. (p.20) 199 *Reference is made to the large quantity of storage dampening variations in water quality impacts.* Not all Laguna storage facilities are large. Please define mixing assumptions this statement is based on. 200 What is the fate of the constituents? Can they combine with other constituents to produce a larger harmful substance? 201

9. The sum of Phthalate esters is given as 7.6 ug/L. (p.22) In the Water Quality Update, the average for 1995-96 is 8.88 ug/L and for 1988-95, 5.58 ug/L. Then the average is given as 7.64 ug/L. How is this calculated? 202 According to Marc Lappe, 203

phthaltes have been identified as a human carcinogen. In Our Stolen Future, it states (pp.223-4) *"Recent studies have implicated widely used synthetic compounds such as phthalates, an ingredient in plastics, and alkylphenol polyethoxylates, which are found in plastics, detergents, and many other products, in hormone disruption."* These substances have been found in the wastewater. With increased population and industry the amounts may grow. What plans are made to continue tracking this substance? 203(cont.)

10. It is very disturbing this document recommends dropping dissolved cadmium and dissolved chromium from analysis since both of these substances have been found in sediments and are known carcinogens. What are the bioaccumulation properties of these substances? Can they accumulate in the sediments and become biologically available to aquatic life? Cadmium has shown up in Meadowlane sediments and Chromium in Kelly Pond and in fact had gone up in 1994-95. In I-13 Sediment Study, page 29, it states that *"...reclaimed water discharge may be contributing to an accumulation of copper and chromium in sediments."* P.29 also states, *"The fact that cadmium was detected in surface sediments only in two storage ponds and below the Treatment Plant discharge indicates that reclaimed water discharge may be a source of WAE cadmium."* It is important that these substances are found at all in proximity to Santa Rosa's wastewater system. Please analyze the potential risk from these constituents to humans and aquatic life. Increased industrial development is likely to add to the load and further monitoring should be called for. How do you define below detection? In the Report of Waste Discharge of 1995, average effluent Chromium is 0.003 and detection is 0.001-0.005. Would this be considered below detection? Does it depend on the lab you use? Similarly the average for cadmium is 0.001 and detection is 0.0002-0.01. Furthermore, these substances, along with copper, lead and mercury in Kelly Pond clams were elevated in comparison to tissues of clams unaffected by wastewater. Was the information in the Waste Discharge Report taken into account? 204 205 206 207

11. Where is the data for dissolved lead? Charts I've seen just gave total lead. Please reference data for dissolved lead. According to Marc Lappe, lead numbers were high and according to the Report of Waste Discharge, Kelly Pond clams showed elevated levels of lead in their tissue. Lead was also found extensively in Santa Rosa Creek and Laguna sediments and wastewater ponds. In light of this, please explain your decision to eliminate dissolved lead from analysis. (Also, please explain why there is such a lack of consistency in the presentation of test results throughout this document and in comparison to other documents!) 208 209

12. On page 24 you list organic chemicals that are being dropped from consideration because their maximum concentration is less than their points of significance. Could you please give the range of detections for the chemicals dropped and monitoring dates? What kinds of changes in industry and population may cause these numbers to go up. 210 211

13. On pages 24-25 you discuss discharge scenarios based on a percent monthly average. We are including the issues raised in our lawsuit which are directly pertinent here! First, the Regional Board does not currently consider it a violation if Santa Rosa averages over a seven day period. There is no permission for a 30 day average. Secondly, this was never subject to a permit hearing and this method does not appear in Santa Rosa's NPDES permit. Therefore, since this is a matter of unresolved litigation, we request that you address the matter now. Otherwise it is likely it will need to be revisited later. We want to see all discharges based on an *average* of the previous day and monitored on a daily basis. 212

14. By definition, is contingency discharge going to be an illegal discharge, or does the City plan to build it into the permit that they should be allowed higher discharges when necessary? 213

15. Is a 15% alternative eliminated? It is not being studied. 214

16. What is meant by statement that *variations in plant reclaimed water quality will be dampened and the quality of the discharge will be much more constant*? Could you please demonstrate how this applies to the various metals and chemical constituents in the water? Are there examples where you can demonstrate this happening? What are the benefits of such an occurrence? 215 216

17. Please give basis for assuming that the chemical constituency in the wastewater will stay the same for higher influent flows. This document seems to commence with an underlying assumption that Santa Rosa is starting with a *tabula rasa* and bears no responsibility for the current condition of the creeks into which it wants to continue discharging. Secondly, this document appears to freeze everything at the moment at which the data was collected and is not projecting any change that would result from an increased discharge and an expanded population and economic base. We would like to see an analysis of the amount of degradation that has occurred in the ponds and creeks in the last fifteen years and then a projection of that increased pollution into the next fifteen years if the discharge is to continue (please also figure in the increased percentage and, if appropriate, the effects of a 30 day average that would allow a much higher discharge). 217 218 219

18. Have you looked at the cumulative impacts of increased pollutant load with existing pollutant load for each individual constituent? Will any of the constituents you eliminated as insignificant become significant in the next 15 years? Where is the analysis to back that up? Would any of the constituents interact synergistically to create a significant impact? 220 221

19. Plant processes frequently break down during high water periods. Have water quality impacts been assessed under break down scenarios? For instance, what is the likelihood of cryptosporidium outbreaks during high flow periods such as occurred in Jan. and Mar. of 1995? Please analyze fate of all measurable constituents during such a scenario. 222 223 224

20. I am going to avoid questions on the model because John Rosenblum will be addressing those issues on our behalf. 225

21. When was heptachlor banned from the USA? If banned before 1991, when it was detected in Santa Rosa's wastewater, then assuming it will not appear again because it is banned is not a rational argument. What are the impacts on human health and aquatic life from any amount of heptachlor? (p.69) 226 227

22. Table 4-5 plays a numbers game and fails to estimate the ultimate impacts of all toxic loadings. Explain how the 50th and 95th percentiles can be the same or almost the same for most constituents. If an average amount is shown for an average year, how are impacts of extreme loadings addressed? Is there an assumption here that 5% and 50% of the time doesn't matter and for which the City will not be accountable? In other words, does the city assume that it will be okay to discharge pollutants 5% of the time? This chart pp.70-74 feels like a mathematical sleight of hand(to be addressed by John Rosenblum). The numbers are a complete abstraction with almost no basis in reality. What is the relation to reality of the following statement: *"The concentrations shown in Tables 4-5 through 4-11 were estimated for the maximum 95th percentile daily average reclaimed water concentration of the three years examined (wet, dry, normal)."* Please explain this sentence so a lay person can understand it and show how individual constituents will be analyzed using this assumption. 228 229 230 231

23. Table 4.7 (p.85 & 91) Phthalates Santa Rosa Creek below discharge shows an increase beyond point of significance for 95th percentile. Why is this not highlighted? 232

24. I'm not going to ask questions about all the constituents but here are a few to illustrate my concerns. In the 1995 Waste Discharge Report (p.19), Chromium average was 0.003. That was at a 1%-5% discharge rate. The projection for the 10% discharge rate (Table 4-7 on p.82) claims Santa Rosa Creek at 95% will be 0.0031 233

and for 20% it will be 0.0027 (p.88). Please explain these numbers. Why did 20% go down from 10%? Why did 10% value go up from 1-5% and down for 20%? 233(cont.)

25. Mercury is another in which the Discharge report had a 0.0008 average; in Santa Rosa Creek for the 95% the value is 0.0002. Why is the value in the Discharge Report higher? 234 Cadmium was 0.001 average in Discharge Report and 0.0006 in the 95% in Santa Rosa Creek for the 20% plan. Why did the discharge at the lower rate have a higher concentration of cadmium? 235 Copper at 20% is 0.012 in the Discharge Report and 0.003 for the 20% option at Santa Rosa Creek. Please compare all constituents to averages in Discharge Report and explain discrepancies. 236 Also explain impacts from high loadings of various constituents from wastewater on the receiving water body. 237

26. Cyanide was not even mentioned in the Waste Discharge Report. Why? Is cyanide testing a recent phenonomen? What prompted current tests? 238 What data is available on this prior to 1995? 239 What data on cyanide is available for Santa Rosa Creek? 240 Is it likely that cyanide that exists there now may have been put there by earlier discharges? What efforts are being made to determine the source of the cyanide?

27. Apparently cyanide is not yet a problem in the Russian River. At least that is what this document tells us (p.115). According to Table 4-9, (p.97) the Russian River above and below the Laguna for the 20% discharge contains 0.0027 for the 50th% and 0.0033 for the 95th%. They are basically the same for the 10% project. Now if the point of significance is 0.0052, (lower than the 0.0067 for Santa Rosa Creek) then please explain why Santa Rosa's increased discharge won't put the river at risk for exceeding that point before the end of this project period. 241 Your rationale is unclear. By the way, how will each of these numbers stand by the year 2010? 242 What is the range of highs for each of the constituents? 243 What is the likely fate of cyanide in a water body? 244 To what extent can it become trapped in the sediments and reabsorbed into the water column at a later date? 245

28. Could we please hear from the EPA on the criteria for the phthalate issue. 246

29. *"No statistically significant difference exists between the concentrations of detectable constituents in the Laguna above and below the discharge, with the exception of calcium, cadmium, copper, and conductivity."* (p.124) Yet chart 4-18 on p.125 seems to indicate that total chromium, total lead, total nickel, total silver, and total zinc appear to also be higher *downstream* of the discharge. Please explain the apparent mischaracterization in the statement above. 247

30. To what extent have Santa Rosa's prior releases added to the conductivity of the Russian River? 248 What were the circumstances and when did the Regional Board lower the conductivity standard for the lower river? 249 What are the problems associated with high conductivity? 250

31. Statement on p.129 says, *"Discharge to the Laguna avoids discharge to the River above the Laguna, and no significant impact on conductivity is expected to occur."* Yet chart on page 115 indicates that conductivity limit of 285 for the lower river would be exceeded in four months. In light of this, how do you explain the prior statement? 251

32. Significant gyrations of the water balance have been put in place by the consultants to show that river discharge is a viable option. For instance, usually a percent refers to a certain flow, but in this document, 95% means the percentage of months in 70 years when the system will work (at least that's what I think it means). Anyone could have told city officials years ago that a 20% river discharge would work most of the time; to spend $13 million plus dollars to get such an answer is the highest level of absurdity. 252

33. Please tell me if any City Council person or Board of Public Utilities person could explain Table 4-21 (pp. 131-132) to me in a clear and understandable fashion? Can any consultant do so? What is a 95th% *concentration* when the percent refers to the number of months the system will be in compliance? 253

34. What data in storage ponds regarding cyanide (p.130) is this referring to? What synergistic complexes does cyanide make with other compounds? What are the potential health effects of such compounds? What period of time was cyanide tested in the ponds? On what basis has it been determined that it does not exceed the point of significance? 254 255 256 257 258

35. Would concentrations for continuing toxicity testing remain as before? In all of the constituencies described in this document, would any of them be appropriate for TIE testing? Please give an example 259 260

36. What are projected costs on a yearly basis for a typical TIE/TRE program. P. 137 claims great potential expense for this but why are no figures put forth in this document? Or, where are they put forth in this document? If higher river discharges are going to require this kind of testing, it seems appropriate to prepare city decision makers for projected expenses connected with their selection. 261

37. Complex mitigation enumeration utilized in Tables 4-26 & 4-27 make it virtually impossible for the lay person to individually analyze the conclusions drawn in each of these instances. See John Rosenblum's comments for further analysis. 262

38. Where has it been established that, *"....50% (six) or more of the monthly means must be less than or equal to the point of significance, the impacts of a 10% contingency discharge, a 20% contingency discharge to the Laguna, and a 20% contingency discharge to the River on conductivity in the Russian River below the confluence are considered to be less than significant."* (p. 151) 263

39. While I am not a mathematician and I cannot refute your equations mathematically, I do know that averages of averages give you a watered down number that bears little resemblance to the real world. The following sentence will be meaningless to the creatures affected by these proposed projects: *"The average conductivities in the Russian River above the confluence with the Laguna with a 20% contingency discharge to the River are predicted to be less than the 50th percentile upper limit point of significance for conductivity (250 umhos/cm) in only three months."* (Whew! What a relief!) Now, in plain English, what impacts does high conductivity create? What is the reason for having a standard (I don't remember reading any explanation.) and what are the direct impacts to the plants and aquatic life affected by this? These elaborate calculations are merely an exercise in how to mask the facts with numbers 264

40. What are the strict irrigation regulations in effect with the North Coast Regional Board? To our knowledge, they have levied only one irrigation fine ($3000 I believe) in all the time irrigation has occurred even though there have been hundreds of over irrigation incidents. (p.168) Please explain how current guidelines in effect in the Laguna are similar to the strict ones being proposed for the South and West County project proposals. 265 266

41. The whole basis for significant adverse impacts in this section (Water Quality) relies on a contrived manipulated definition. There is no attempt to look at what is being impacted. There are no human health (epidemiological) studies, few aquatic life studies, no direct studies on the well being of most plant and animal species being directly impacted by this project. The information is presented in a piecemeal and disjointed fashion and fails to utilize a uniform format for easy comparisons. The mixing of means and medians and long term averages appears to be an attempt to present numbers so as to minimize impact 267

42. This document admits to changes in urban run off amounts (p.168) as the South Santa Rosa and Rohnert Park areas develop and the pervious surfaces are covered over with cement. What is the composition of that urban run off? What are Santa Rosa discharge levels when those occur and the levels of contaminants in the wastewater? What is the common fate of the constituents that get discharged together with the urban run off? Are any of these estrogenic chemicals that intermix and get stored in sediments to cause potential health problems to humans and wildlife? Do any of these constituents impact the wells along the Laguna? Have 268 269 270 271 272 273

there been any studies on the wells in the Laguna? What have they indicated? Has 273 (cont.)
there been any impact on Sebastopol's wells from discharges and urban run off? 274
Please list the additional chemicals in urban runoff that are expected to be added by 275
the accommodated projected growth allowed by this project.

43. The statement is made on page 169 that, *"No cumulative projects have been identified* 276
that would change background water quality conditions in the Laguna or Santa Rosa Creek,
which are not affected by any wastewater discharges except that of the Subregional system
and the City of Windsor." What is meant by this statement? Please explain. Urban run 277
off has often been cited as a source of much contamination in the Russian River and
the Laguna. Please explain to what extent your modeling of contaminants loadings
has included estimates for runoff toxins.

44. It seems as though the above statement indicates that because the point discharges 278
are regulated, therefore they will not cause impacts from their discharge. Is that a
true interpretation? Please enumerate all upsets and breakdowns at both SR and 279
Windsor Treatment Plants. What was the fate of the wastewater in those
circumstances? For example, city consultants recently explained a significant rise in 280
cryptosoporidium cysts in the wastewater with the explanation that the filters were
not functioning at full force in 1995 for about six months. What was the effect on
water quality due to headloss of the filters in February, 1993? What was the water 281
quality effect loss of about 1 foot of media in each of the filter cells for the period
March 10, 1993 to October 2, 1993? What was the effect of a large mass of rags and 282
grit entering the plant in March, 1992? What about the mudballs building up under 283
the filters in May, 1993 causing lowered filter efficiency? What happened when 284
Digester #3 broke down in March, 1993? What tests were taken for cryptosporidium
at that time? And what about problems in the Lab? What was reported when three 285
days of bad coliform samples caused them to be invalid in April, 1993? What has 286
been the impact on lab testing when employee relations are so bad that psychologists
and other personnel consultants needed to be brought in on a regular basis because
the people in the lab couldn't get along with supervisors or each other? Similarly, 287
please list all the failing fish bioassays. What about the unacceptable analysis of 288
copper, nickel, and chlorine residual in the August, 1993 evaluation by the Dept. of
Health Services Santa Rosa's lab, as well as the citing of unacceptable conditions
such as unlabeled containers, a rusted container of magnesium, and diluted sulfuric
acid under the wash up sink? What assurances are in place that the lab is 289
functioning properly at all times and that all test results can be thoroughly relied on?
Was there any testing at the time of above mentioned upsets? If so, what were the 290
results for all constituents of concern? If not, explain why it is safe to assume that 291
there were no release of toxins into the system. I can go on extensively with this list 292
but the theme is clear. Things are constantly going wrong. Oversight by the Regional
Board is very loose. Many assumptions are made. The Regional Board very seldom
takes action on a problem if the City reports it to them in a timely fashion. This is
not to say that there is no impact from the situation. This EIR assumes that the
system is always functioning properly and fails to address the many excursions from
a perfect operation.

45. High water periods are the times that Santa Rosa's system is most likely to 293
experience upsets, as it has many times in the past, especially with the filters.
Sometimes discharges occur before those upsets are discovered. What is the history
of upsets (last ten years) of Santa Rosa's plant? How were those upsets dealt with?
What are the potential impacts on humans and wildlife from pathogens, heavy 294
metals, organics, etc. when storm water discharges (both during upsets and ordinary
discharge) combine in the waterways? It is our contention that computer modeling 295
using averages and estimates does not give a true picture of the impacts (see John
Rosenblum's comments). This document relies on estimations of what might be in the
water at a given time, and determining that if the estimate represents a regulated

amount of a regulated substance, that it is entirely adequate. This does not describe to us what is happening in the environment to the living beings that inhabit it. 295 (cont.)

46. All of our above questions apply to this document's allegation that there can't be any cumulative impacts from all the wastewater systems combined because they will only be doing what the Basin Plan allows. What changes in the Basin Plan is Santa Rosa anticipating as a result of this project? Since the intent is to change the Basin Plan to allow higher discharges, then is this another circular argument? The question should be, who is discharging cyanide (and all other 118 constituents examined in this document), what is the cumulative amount entering the watershed and what are the impacts from Santa Rosa's addition? This should be done for all constituents currently monitored in Santa Rosa's wastewater, but this document makes no attempt to analyze other river discharges. 296 297

47. Every winter at the confluence of Mark West Creek and the Laguna there is a large plume of sediments or some type of organic matter that enters the river and causes long lasting and large amounts of suspended sediments in the river that has a detrimental impact on fishing. Please explain what causes this and how Santa Rosa's wastewater contributes to the situation. Also please explain, in relation to cumulative impacts, why the lower river appears to have a large amount of algae in it all summer (deep green color) and extensive amounts of sediment (muddy brown color) all winter, even long after storms have ended. To what extent has Santa Rosa's discharge contributed to these conditions? 298 299 300

48. Would city officials be willing to establish limits for all chemicals of concern and guarantee not to exceed those limits? If this water is so clean, then there should be no problem making guarantees to back up the product. While the requested limits may not be *legally* required; this would establish a mechanism to require Santa Rosa to certify that tertiary wastewater is indeed safe. 301

Vol. VIII 302

L-1: Fish Migration

1. Statement is made on p.4 that low coho numbers in the Laguna could be related to wastewater discharges. No statement is made however about the potential impact of discharging estrogenic chemicals into the waterway and the consequent reproductive impacts. It is most disturbing, since surfactants have been suspected for a long time as being toxic to aquatic life, that the possible impacts are not being attempted in this EIR. We may ask however, as this issue comes more to the forefront, how would Santa Rosa deal with potential requirements if surfactants were found to cause lethal OR sublethal toxicity in aquatic life? If Santa Rosa were truly sincere in not wanting to destroy the environment with their excessively high wastewater discharges (Laguna), it would take responsibility for exploring all possible information on potential harmful effects. I submit with this document two studies concerning fish and surfactants: *Chronic and Sublethal Toxicities of Surfactants to Aquatic Animals: A Review and Risk Assessment* by Michael A. Lewis, and *Detergent Components in Sewage Effluent are Weakly Oestrogenic to Fish: An in Vitro Study Using Rainbow Trout Hepatocytes* by S. Jobling and J.P. Sumpter.

2. We have seen several different reports that steelhead may spend a great deal of time in the main stem of the Russian River and often even spawn there. What impacts will occur if River discharges are increased significantly during the spawning period? 303

3. An assumption is made (p.16) that because fish can swim several miles in one night (how many is several) that they would start at the Russian River during high flows and move through the wastewater discharge in one night. While we don't question that that is possible, how can one assume the fishes' route at any time? And if the assumption is correct, why not also assume that the fish were waiting for higher dilution (therefore cleaner, more oxygenated water) before they moved through? If 304

most of the fish swim through during high flows, what is the value of learning that a few dumb fish will swim through the higher concentrations, during lower flow periods? In other words, how do you know what the dilution factor was when the fish chose to make the migration? The dilution factor would be much higher in the Russian River and higher in the Laguna than in Santa Rosa Creek. 304 (cont.)

4. The study ostensibly did not choose to study all migration. (p.16) Yet that is the fallacy of the study; it COULD NOT study all migration which would have made it a much more valid study. The vast numbers of fish migrate at a time when the study elements simply were not in place. How could you know how many fish avoided low flow periods to move through the higher quality water? That would have been a very important piece of information. 305

5. Consultants developed elaborate mathematical equations to estimate stream flow between Meadowlane Pond, Delta Pond, Santa Rosa Creek, Laguna, Mark West to the Russian River. Stream flow was available for Santa Rosa Creek upstream of the Delta discharge. Discharge flows were available for Meadowlane and for Delta discharges. Data was also available for Mark West Creek upstream of the Laguna confluence and upstream of the Russian River. Data was available for Mark West Creek downsteam of the Laguna confluence. But no data was available for the Laguna upstream of Meadowlane. WHY NOT? It is impossible to be precise about the percent of effluent in the Laguna without knowing what is coming in upstream. 306

6. Considering that the fyke nets ranged the whole width of the creek bed and were in 307

7. Santa Rosa Creek off and on for 129 days (most of the winter season), there were relatively few adult salmonid fish caught. Were any of the fish caught going downsteam already counted among the fish that had already gone upstream? In other words, are you sure you did not double count? Was there any attempt to 308 discover historical numbers of fish running this creek? There is no doubt that this 309 study showed that some fish will swim through wastewater. Some will even swim through high concentrations of wastewater. But how many are hanging out in the river longer to avoid low flows and high concentrations of wastewater? (I've heard there was spawning in the last several years in the Russian River itself.)

8. What are the impacts of very high water diversions on the Maacama Creek in terms 310 of fish migration? Is this creek a good reference for what natural fish will do in non- 311 wastewater creeks? Could these water diversions explain the very low numbers of 312 wild anadramous fish caught?

9. How many fish can be spawned by a single female adult? How many fish were 313 | 314 necessary to spawn the number of young fish caught going downstream? Why were 315 juvenile fish were going upstream? Could some of the juvenile fish been counted more 316 than once? Why it is clear that some of the fish were caught more than once, it is not clear how they were counted in the statistics.

10. How can you make judgments about the relation of up migration to down migration 317 when no fishing occurred during high flows, a time when fish tend to migrate? It is 318 not clear whether fish ever get double counted. How many fish hang out in the river 319 until high flows and then move upstream? To what extent do the younger fish swim 320 up and down the various reaches? While some of the fish you caught may also 321 spawn, what can you say about the reproductive health of the offspring? How can 322 chronic toxicity of wastewater on these fish be determined with this limited program?

11. Were any fish tissue analysis conducted on the dead fish caught? If not, why not? If 323 yes, what was found?

12. Why Figures 4-5 through 4-8 refer to number of rainbow trout? Was this meant to 324 be steelhead?

13. Have any similar studies been conducted in other areas where natural conditions are 325 similar to our own but man's activities have been less intrusive? If so, what were the findings in terms of the numbers of fish caught?

14. While there is no doubt that other factors may be very harmful to fishery life such as water diversions, erosion, lack of riparian, etc. this study did not prove that wastewater has no impact on migration, reproduction or the general health of the fishery. The small number of fish caught over a long time span is hardly proof of the safety of the wastewater. Neither is it proof that a few fish have appeared to have successfully spawned. Until the number greatly increase and fish tissue analysis guarantees that these fish are not impaired by contact with pollutants found in wastewater, you have not persuaded this jury! 326

15. Maacama Creek is not a very good reference creek because of the high level of water diversions. 327 It is also dangerous to brag that fish don't mind wastewater, since that may be one explanation for why so few fish are left to experience it. Until you can prove unequivocally the wastewater is safe, which you hardly do in this study, it might be best to avoid making too many claims. 328

16. This study found far more down migrants than up migrants and tries to claim (p.80) that the number of down migrants may indicate a much greater number of up migrants than were found in the fyke nets. The reasoning utilized is highly suspect but even if it is correct, it can only help to establish that steelhead like to migrate in high flows of cold, oxygenated, fast flowing water. 329 No compelling evidence was provided indicating that increased discharges provide the environment they require. 330

17. Why was there little attempt to differentiate between male and female fish on the charts generated showing numbers of fish swimming through wastewater? 331

18. On Aug. 9th, the Russian River steelhead was proposed for listing as endangered by the National Marine Fisheries. Until more is known about the effect of wastewater chemicals and nutrients on this fishery, continued wastewater discharges provide a risky environment for this national treasure. 332

19. What is the difference between L-1 and L-2 other than one goes to 1994 and the other to 1995? It appears as though large portions of these documents are exactly alike. Why were these two documents not combined and presented as one document? Since they are not *exactly* alike, it behooves the reader to wade through large amounts of repetitive material and is a waste of ratepayer's money!! 333

20. In general, the number of adult steelhead migrating upstream have been less than impressive and the coho numbers are abysmal. In all of 1993-94, only 16 adult steelhead and no coho were caught moving upstream in 129 days of fishing. In 1994-95 the numbers were even worse, 1 adult steelhead and no coho caught moving upstream in 59 days of fishing. 334 How many of those fish were male and how many female? 335 How in the world can this study come to the conclusion that salmonids don't mind swimming through high wastewater concentrations? 336

L-4: Aquatic Habitat Survey 337

1. Habitat requirements (p6) are unclear as to what habitat is required for migration and which for spawning? 338 What are the temperature requirements for steelhead and coho?

2. Statement is made (p.10) that upstream Mark West Creek is in a fairly natural state and supports self-sustaining runs of wild steelhead. Why is no mention made of the serious water draw down in upper Mark West Creek as a result of wineries and other ag operations? 339 What are all the factors creating warm water habitat in the Laguna, Santa Rosa Creek and the Russian River? 340 To what extent do the nutrients in wastewater contribute to the warm water environment in these places? 341

3. Habitat descriptions were very cursory. How do you define aquatic habitat? Shouldn't it include descriptions of the vegetation, animal, and insect life, and geomorphology of the water way? Shouldn't it also describe the condition of the various aspects of the habitat? (Some of this seems available in the next report, L-5 342

Aquatic Life Survey Results. The organization of these various reports is repetitive and confusing.) 342(cont.)

L-5 Aquatic Life Survey Results 343

1. What is the status of the various species of frogs in the Russian River and its tributaries other than those mentioned on page 3 of this section? What evidence exists as to their threatened status possibly resulting from contact with environmental estrogens? 344
2. Maps are horrible and difficult to make out waterways in reference to streets. Many people are familiar with a waterway from the reference point of a street going over the waterway. Why couldn't this document use better maps? 345
3. The only aquatic life surveys for the Russian River watershed was for new irrigation areas such as Sebastopol and Green Valley Creek. We disagree with the assumption of this EIR that it is not necessary to examine the entire watershed for the condition of aquatic life since irrigation will not be increasing in the Laguna. What is the cumulative impact of years of increased wastewater flows on the aquatic life of the Laguna and its tributary creeks? Will there be no increase in the amount of water currently used by each of the irrigating farmers in the Laguna area? Will there be no new farmers and new lands signed up in the Laguna for irrigation? What impact might increased flows have on the kind, distribution, health, etc. of existing aquatic life in the Russian River and its tributaries as a result of this project? 346 347 348
4. If the California fresh water shrimp were found in Green Valley Creek, what are the chances it might be found in the Laguna, Mark West Creek, Santa Rosa Creek, or the Russian River? Please explain answer. Also, what about all the small, unnamed creeks running from wastewater ponds to the main tributary (any chance of aquatic life)? The CA red legged frog and Northwestern pond turtle, etc. are found in tributaries of the Russian River. Besides Crane and Copeland Creeks, are any of these species found in tributaries to the Laguna? Because of the CA red legged frog, CA freshwater shrimp, and the Northwestern pond turtle have been found in Laguna tributaries, is it safe to assume that they might also be found in parts of the Laguna downstream? Is any of the habitat through which the wastewater flows suitable habitat for these species? 349 350
5. In this section there were a list of aquatic invertebrates for the dam sites and for drainage areas for new irrigation. Why were no lists given for the Laguna and Russian River? Is there no chance that higher river discharges will affect aquatic invertebrates? Please explain. 351a 351b
6. Again, is the rationale for not addressing Laguna irrigation in regard to aquatic life surveys that absolutely no change will occur from current operations? Just looking at that issue using one irrigating farmer as an example such as Stan Denner. In 1992 he irrigated 205 acres and used 276,055,100 gallons (was paid almost $43,000) In 1993 he irrigated 285 acres and used 287,676,200 gallons (was paid almost $45,000). In 1994 he irrigated 285 acres and used 368,356,300 gallons (was paid almost $60,000). In 1995 he irrigated 285 acres and used 295,351,600 gallons (was paid a little over $46,000). Except for the last year (a very wet year), there was a steady pattern of significant increase in the amount of irrigation. What are the cumulative effects of these increases? Please examine the other water users as well. 352

L-6: Affects of Bioaccumulation in Organisms exposed to SR's Reclamation System 353

1. Under bioaccumulation in plant tissue heading on page 1, the statement is made that cadmium was not assessed because the concentration in sediments was below analytical detection limits. It needs to be mentioned however that this is at Kelly Pond but not at other parts of the system. In fact, on p.16 of I-13 it states that the occurrence of cadmium in other locations indicates that wastewater may be the

source. What is the likelihood that once Kelly has been on line awhile longer, cadmium will show up in the sediments, aquatic life, and vegetation there as well? 353(cont.)

How long has Kelly been on line compared to Brown Pond? We selected cadmium because we do not have time to check out each of the metals. The sediment information and bioaccumulation studies should have been placed side by side for easier comparison. 354 355

2. When concentrations of metals are noted in aquatic life, are these likely to increase over time? Was the whole like cycle of the aquatic being studied? How do you account for the reduced metals concentration in 1994? Where did they go? Could the reduced levels in Kelly Pond in comparison to reference sites be a factor of the length of time wastewater had been stored there? Where are the reference sites? 356 357 358 359 360

3. Why does this report state that the Mussel Watch program was dropped because of its erratic results? 361

4. There is no study of pesticide compounds because they were not found in sediments or mosquitofish. But what about the use of pesticides on farmlands that are irrigated in the Laguna area? What studies have been done to determine whether irrigation run off carries pesticides with it? Which irrigating farmers use pesticides? What do they use and how much? Do these pesticides bioaccumulate in the waterways? What is the fate of these chemicals when sometimes they are seen and sometimes not? This is becoming a much more important issue due to the estrogenic effects of pesticides. 362 363 364

5. There are frequent comments about the low level of these chemicals in evidence. How is low defined when making value judgments? Does low equal safe? How is safety determined? Which of these heavy metals is estrogenic? carcinogenic? causes birth defects? etc. 365 366 367

6. What is the timing of these tests at Kelly Pond? In the spring, when plants are growing they take up a lot of the harmful constituents in the wastewater. Is it the harvesting of those plants in the fall forming the basis for the tests? Please explain the whole process of obtaining information from Kelly Pond including the dates that samples were collected. 368

7. Statement is made that no significant risk for adverse effects on vegetation from exposure to Kelly Pond sediments was identified. (p. 2) Yet, why would the importance be the effect on the vegetation? Isn't the important factor the impact on the aquatic life that eats the vegetation and then the bioaccumulation of the substance? How do these chemicals make their way up the chain of life? When the metals content of the sediments goes down, where does it go? 369 370 371

8. It is important to have data from all the cells. It is of concern that only data from one of five cells is being used in this project. I vaguely remember that one cell was much higher than the others. Please give data for the other four cells. 372

9. Are the substances in the sediments separate from the plant? Don't the plants draw these toxins into themselves from the sediments? If this is so, is it always so all the time? What are the circumstances under which this uptake occurs? Can toxins be taken from the water and not the sediments? How and when does this process occur? 373 374 375 376

10. While I know little about benchmark values, how can we be sure that the benchmark values selected are indeed representative of the life forms in the Russian River watershed? What do these benchmark values mean in relation to bioaccumulation potential of the constituent? 377 378

11. It is unclear (p.11) how you determine NOEL values where they are not present and LOEL values are relied upon. Please explain. 379

12. When giving the average values for sediments in Table 3 (p.14) were the WAE or SAE values used? 380

13. In comparing 1991 and 1994 (p.18), the mean and range was given for 1994 and not 1991. What does the 1991 number represent? 381

14. Since the concentration for arsenic went up for crayfish in the range, why not mention it? 382

15. For chromium (p.20) the Cattail Rhizomes had a range that went over 1991 value that deserves mentioning. 383

16. Is the glass half full or half empty? Your analysis always concentrates on the half full part. There are higher metals present in 1994 than 1991 in Cattail Rhizomes (3x), Bulrush Seeds (1x), Crayfish (4x), Mosquitofish (5x), and sediments (3x). There seems to be an attempt to minimize the importance of these. Since we have not been given adequate time to consult with experts in this issue, we reserve the right to challenge your consultant's analysis at a later date. 384

17. Isn't the whole point of this study to show where the metals go? Are they all taken up by the plants from the sediments? Do they ever transfer back to the sediments from the plants? 385 Your relating these amounts to the wastewater was unclear. Do these numbers always represent what is coming out of wastewater alone? 386 When mosquitofish with cadmium in their bodies die, where does the cadmium go? 387

18. What is the relationship of sediment concentrations of heavy metals and plants and aquatic life? 388 How can one be a percentage of the other? If copper shows up in crayfish, how does the percentage relate to the percentage in the sediments? 389 390

19. Are the comparisons of heavy metal bioaccumulation test results to sediment metal contents an accepted manner of showing bioaccumulation? It is stated that there were very few studies on this. Is there as much evidence for this method as there is evidence of the estrogenic characteristics of certain chemicals? In other words, would this scientific analysis be considered speculative by other toxicologists and biologists? 391

20. I am unable to obtain a professional assessment of the analysis provided here before the deadline of these comments. I reserve the right to bring this issue up at a latter date in more detail. 392

21. According to this analysis, heavy metals do not pose a serious risk to small animals. Yet how does this risk increase as more wastewater is processed and discharged and more industry comes into the area as a result of the accomodation of this project? 393

Do these ratios hold up if the analysis was pointed towards estrogenic impacts of these metals (i.e., cadmium, lead, mercury, etc.) 394

22. Also, can an animal get cancer from exposure at these benchmark levels? If not, how do you know? 395 How do you know that in the case of cadmium, lead and mercury, these levels can't affect reproductive success? 396

23. In clam data on p.54 it shows higher levels downstream of the discharge for six organics. The rationale is given that Santa Rosa's wastewater did not show any elevated readings at that time to justify attributing the increase to their discharge. Yet Santa Rosa's monitoring of organics occurs only once every three months. Furthermore, it is not unusual for Santa Rosa's filters to experience diminished efficiency on an occasional basis. In light of this, how would you prove that Santa Rosa's wastewater was not to blame for these increases? 397

L-7: Aquatic Biological Resource Impacts Analysis 398

1. On what basis did the No Project Alternative suddenly become a 10% alternative? (p.9)

2. The statement on p.26 is maddening, *"There is no apparent relationship between fish movements and reclaimed water concentration in the streams; migrating salmonids in Santa Rosa Creek and Mark Wrest Creek have shown no preference for low concentrations of reclaimed water, nor avoidance of high reclaimed water concentrations."* This conclusion was based on a very limited number of adult salmonids traveling upstream during low flows. (ie. 16 adult steelhead in 1993-94 in 129 fishing days and 1 adult steelhead in 59 fishing days, 1994-95, both in SRCreek. Mark West Creek had 15 399

and 5.) The study itself admits that many more fish migrated through high flows when fishing did not occur. In light of these numbers, the conclusion seems rather contrived. 399 (cont.)

3. Since there are no studies of estrogenic impacts on these fish, how can you assume that the spawning was completely successful? Is it known about the reproductive viability of the offspring? (p.27) Most of this section simply repeats the Fish Migration Study. What kinds of migration study results would have been expected to show that the wastewater was affecting the migratory instinct of the fish? How do you know that the migration instinct of individual fish was not sometimes confused? 400 401 402 403

K-4 Ecological Risk Assessment 404

1. All of the questions asked regarding sediment sampling and analysis and water quality impacts would also apply to this section.
2. Did you assume that the risk to the embryos, infants, and young offspring would be the same as for adults? Did you analyze the data with consideration for these sub groups? Was all data simply analyzed for adult species? Was any differentiation of impacts made for males and/or females, especially pregnant females? How would you analyze risk to the young and unborn? 405 406 407
3. Did you consider any airborne exposures (ie. possibly during volatilization?) Did you consider exposure through the dermis by inadvertent touch and other pathways? 408 409
4. Document states that detected concentrations of chemical substances were used as exposure values for aquatic organisms. (p.2) Were cumulative contact (all pathways) of Santa Rosa's discharge considered with other discharges into the Laguna and Russian River, including but not limited to: urban run off including runoff after the first major rain, all other river discharges including those of paper pulp industries, toxic load of river during high water/flood event, any loadings occurring as a result of logging and gravel mining, toxins accumulated from vast amount of garbage thrown into the river, and inadvertent accidents such as accidental spills? What about sources of contamination that include the illegal placement near creeks of asbestos laden sewer pipes that were being illegally disposed of? 410
5. Was any consideration given to the risks enumerated from environmental estrogens on reproductive capacity among other things? (I am including the book by Theo Colborn entitled, *Our Stolen Future* where she dramatizes potential risks from these chemicals for the general public.) While the levels of certainty of risk for environmental estrogens has not yet been extensively defined, the amount of documentation of impacts is extraordinary. How you can justify completely ignoring it in your analysis especially in conjunction with other exposures in the river? 411
6. Was the entire Russian River downstream of the Laguna's convergence with the river included in this study? What assumptions were made about contamination levels in the lower river? Did these include cumulative assessments with other sources of contamination mentioned above? Were lifetime exposures considered? 412 413 414
7. Were any tests done on cumulative exposure of the affected population to viruses, parasites and other pathogens? Were any water test samples of pathogens taken at a time when the filters weren't functioning to full capacity? Actually, we were told there cryptosporidium samples were taken in 1996. The number of cysts jumped way up during lowered filtration effectiveness. Was this taken into account when the risk assessment data was assembled? 415 416 417
8. Table 4.4 claims to represent average tissue concentrations of metals in various species. The numbers are considered conservative because it is theorized that exposure will be constant, which, it is assumed, is not actually the case. Is exposure potential the same for high concentrations as for low? Are averages a realistic 418 419

measure for determining level of exposure? What about cumulative exposures that consider other sources of contamination? 419 420

9. Have there been any tissue samples taken or autopsies conducted on dead seals or other dead water animals to determine cause of death? Has the Marine Mammal Center or any similar organization conducted any studies of what seals die of at the mouth of the Russian River? If so, what were the results? 421
10. Was only heavy metals data from Kelly Pond used to determine ecological risk? Was any data developed to estimate cumulative exposures to all potential toxins in the Russian River? 422
11. Table 4.4 consists of average metals in tissue concentration at Kelly (p.4-9). Table 19 (p.33) in Evaluation of Bioaccumulation... supposedly presents the same information yet five of the values are different: cadmium levels for cattail rhizomes and mosquitofish, lead in bulrush seeds, mercury in cattails and selenium in cattails. Please explain the variances. 423

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J-2: Human Health Risks

1. We have not had time to analyze the data presented in great depth. We reserve the right to bring up issues around this data in more detail at a later date. We bring up here the issues we are most concerned about regarding public health. Also, please see Dr. Marion Mose's letter attached.
2. One of our prime concerns is giardia and cryptosporidium. The latter has become such a serious health concern that the American Water Works Association has devoted their entire Sept., 1996, issue to the subject (We submit two of the key articles with this paper.) Cryptosporidium is a pathogen which has created serious health outbreaks across the country, for which there is no cure and which can be deadly to children, elders, and people with compromised immune systems. 425
3. This section (J-2) draws conclusions about this pathogen based on four samples. This is obviously inadequate but we have become aware of the additional testing that appears in H-3 p.9 where it states that from Feb. 95 to Feb. 96, there was an average of 200.6 giardia cysts and 9 cryptosporidium cysts (as opposed to none in the previous tests). Consultants blamed malfunctioning filters over a six month period for the high counts. The numbers went down when the filters were functioning properly. 426
4. What we question is that it is a common occurrence for the filtration system to experience problems. In Oct. 1993 there was a loss of filter media greater than had occurred in the past. In Feb. 1993 filter media was found to be too fine and was compacting. In April 1993 there was problems with fibrous material in the filters under the drain system. In June,1993 *mudballs* were found in the filter media, etc. Furthermore, filter bypasses are not unusual during high water flows such as in Jan. and March, 1995. (This list was based on a cursory check of our information. We intend to do a more thorough review at a later date.) 427
5. Because systems do break down, and because the Sonoma County Water Agency and other downstream water users do not filter their water supply, we believe that cryptosporidium is a real and present danger. Outbreaks of this incurable disease have occurred in filtered water systems that were meeting all regulatory requirements. We also include the article, *A Global Decline in Microbiological Safety of Water: A Call for Action* from the American Academy of Microbiology. These articles emphasize that even filtration and disinfection cannot be relied upon to remove these pathogens. 428
6. A recent article in *Science News* (Sept. 28, 1996 p.199) entitled *'Clean' water may infect swimmers*, questioned the wisdom of using only coliform tests as an indicator of infectious disease. They found that, *"....respiratory disease in the swimmers was* 429

associated with their exposure to fecal streptococcus, a type of noncoliform bacterium." If this is true, then a whole new type of testing should become required and possibly a whole new set of standards may evolve. 429 (cont.)

7. As we are pointing out, new health discoveries are coming out at a furious pace. Is Santa Rosa going to merely stick with the old standards even while new information implies significant risk from higher discharges? To what extent does Santa Rosa have a responsibility to assure the health safety of its discharge whether or not current laws have caught up with new information? 430

8. What is the risk from phthalates of reproductive health effects (especially bis(2-ethylhexyl) phthalate? 431

9. Many of the issues we raised in the section on Ecological Risk Assessment are pertinent here as well. In the interest of time and space we will not repeat them. 432

10. What is the possibility for summertime impacts on the river from wintertime discharges? In other words, any toxins released go somewhere, how do you know they will not get trapped in a sediment and rereleased upon contact? 433 What is the fate of ALL coliforms, organics, heavy metals, pathogens, etc. as they leave the plant? 434 What are ALL the opportunities for contact by summer river users? 435

11. Have there been any health surveys of people who have wells along the Laguna? That would be an interesting and easy to obtain source of health information. How many cases of cancer, still births, sterility, infectious diseases, etc.? If not, why not? 436

12. Do the toxicity values for sensitive sub populations take into account the possible accumulation of toxins in fat tissue? In other words, how is the cumulative impact of various exposures addressed? 437

13. Some of the best fishing used to be in February, or at least at a time when discharges are occurring. What is the specific risk to fisherman from exposure to wastewater (in enough detail to satisfy their curiosity, should they ask)? 438 Also, April and May are sometimes balmy months in Sonoma County when it is not terribly unusual to see swimmers and recreationists on the beaches (public and private). What is the risk to these people from contact with the river? (p.2-9) 439

14. How do you know that no sustenance fishing occurs in the river? What is the risk to people who do eat a lot of fish? 440 Have you done any tests on fish tissue to determine toxicity of various species? 441 442

15. What are the risks to someone (adult or child) who may accidentally fall in the river? 443

16. What are the compounded risks of using river water in clean up efforts after a big flood? 444

17. What happens to toxins in dead fish and other animals that are left in the river? This whole idea that toxins *go away* is a fallacy. What is the whole circular process of toxins in nature? What is the entire fate of all constituents in Santa Rosa's wastewater? 445

18. Almost all of the risk assessment analysis came out in favor of the cities effluent being safe. We intend to look at this assessment in greater detail later. But do any of these assessments look at impacts in conjunction with other exposures? There are many sources of contamination in the Laguna and Russian River; was the compounded effect of all those other sources considered? 446

19. One of the greatest concerns of scientists concerned about xenoestrogens is about the interaction of very minute exposures to multiple toxins. I enclose an article about a recent study by John McLachlan and others entitled *Synergistic Activation of Estrogen Receptor with Combinations of Environmental Chemicals.* The basic idea behind this study is that multiple low potency exposures to estrogenic chemicals can cause the effects on the endocrine system to magnify a thousand fold. Has this study given any consideration to the magnification possibilities of multiple exposures? 447

20. Where were dioxins discussed? Somehow we didn't see them. 448

21. The consultants did a water quality update in another section where they reassessed cryposporidium cysts occurrence in the wastewater. Yet page 3-16 does a health 449

assessment based on the old non detect data. They explain away the six month excursion with the excuse the it was unusual occurrence not needing further discussion. Yet I have evidence, as mentioned before, that the filters have relatively frequent periods in the last five years when they were not working to optimum capacity. We would like to see an analysis of the health risks associated with the high levels occurring in 1995. 449 (cont.)

22. Please explain the scientific communities' beliefs about the ability of chlorine to disinfect cryptosporidium and giardia. 450

J-3: Human health and wildlife effects of environmental estrogens. 451

1. While this was an interesting assessment of the problem, there is an admission that these theories will not be utilized in the assessment of health risks to humans and wildlife.
2. I have decided to enclose the book, *Our Stolen Future* in the hopes that decision makers will be urged to read it and cause a more realistic level of human health assessment to be implemented. 452

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Chapt. 2: Mitigation & Monitoring Program

1. Why not institute an irrigation management program in the Laguna? It is badly needed. Also, why not prohibit farmers who over irrigate from being eligible for no interest loans? 454
2. Why not utilize irrigation site resource maps in the Laguna, especially in regard to oak trees? 455
3. Also, why not follow same irrigation practices for Laguna as in 2.2.3, 2.2.4 & 2.2.5? 456
4. Will the pesticide control program (2.5.1) cover the Laguna area as well? 457
5. I am enclosing RRWPC's *Trial Brief, Proposed Decision and Findings*, and *Closing Argument*. RRWPC and supporters have very serious problems with the proposed increased discharges into the Russian River. Whether or not we ultimately prevail in our pending lawsuit, we believe that we have made very credible arguments in support of carefully regulated manner of discharge and would like to see these concerns become part of the mitigation plan. 458
6. Table 2.5.1 says nothing about discharges at 20%, only storage. What will be you discharge plan for the season? Please explain in detail. What is meant by *reduced* fall and spring discharge? 459
7. It is unacceptible that the city will not start a Cyanide source control program immediately. What happens to volitilized cyanide? Is there any risk as it takes other forms with other constituents? 460 461 462
8. Nitrogen loading mitigation: please see John Rosenblum's comments. 463
9. Will there be a toxicity identification program for sublethal toxic amounts? 464
10. Seeing as Santa Rosa super saturates creeks with its discharge, discharge prohibition should begin lower than 31 feet. Please explain the basis for choosing that amount. We recommend 28 feet for sure, and/or any time a flood is being predicted within 2 days. 465

Note: It occurred to me, after printing this long document that while I had brought up the estrogenic aspect of wastewater and the chemicals in it, I hadn't asked about the possible estrogenic activity as a result of *surfactants* in the water. I want to include that issue though I know the city has not taken any action on it to this point. At the very minimum, I request that the city obtain more information and consider future action. 466

ATTACHMENTS

1. *Santa Rosa's Environmental Impact Report;* Comments by Brenda Adelman, Sept. 24, 1996
2. ***Our Stolen Future*** by Theo Colborn et.al. Penguin Books USA, Inc. 1996
3. Letter to Brenda Adelman from Dr. Marion Moses, 10-2-96
4. *A Global Decline in Microbiological Safety of Water:* A Call for Action, by T.E.Ford &R.R.Colwell, a report from The American Academy of Microbiology, 1996
5. *US Outbreaks of Cryptosporidiosis,* H. Soto-Gabriele & S. Newmeister, AWWA Journal, Sept. 1996, p.76
6. *Waterborne Disease Surveillance,* by F.J.Frost, G.F.Craun, & R.L.Calderon, AWWA Journal, Sept., 1996, p.66
7. *Synergistic Activation of Estrogen Receptor with Combinations of Environmnental Chemicals,* by S.F.Arnold, D.M.Klotz, B.M.Collins, P.M. Vonier, Louis J. Guillette Jr., John A. McLachlan, Science, Vol. 272, June 7, 1996, p.1489
8. *New Yeast Study Finds Strength in Numbers,* by J.Kaiser, Science, Vol 272, June 7, 1996 p.1418
9. *'Clean' water may infect swimmers,* Science News, Vol. 150, Sept. 28, 1996, p.199
10. *Detergent components in sewage effluent are weakly oestrogenic to fish; An in vitro study using rainbow trout (Oncorhynchus mykiss) hepatocytes,* by S. Jobling and J.P.Sumpter, Aquatic Toxicology, 27 (1993) pp. 361-372
11. *Estrogenic Effects of Effluents from Sewage Treatment Works,* by C.E.Purdom, P.A.Hariman, V.J.Bye, N.C. Eno, C.R. Tyler, and J.P.Sumpter, Chemistry and Ecology, 1994, Vol.8, pp.275-285.
12. *Chronic and Sublethal Toxicities of Surfactants to Aquatic Animals; A Review and Risk Assessment,* by Michael A. Lewis, Water Resources, Vol. 25 #l, pp.101-113, 1991.
13. *Endocrine-disrupting environmental contaminants and reproduction; lessons from the study of wildlife* by L.J.Guillette, Jr., Women's Health Today, Pathenon Publ. Group, New York, pp.201-207, 1994
14. *Something's Fishy,* by Janet Raloff, Science News, Vol. 146, July 2, 1994, pp. 8-9
15. *Cryptosporidiosis-A Growing Public Health Concern,* California Morbidity, Department of Health Services, Berkeley, May 5, 1995, #17/#18
16. *Sue Kramer Report/Recommendations,* To Dennis Baker, et.al. from Miles Ferris and Scott Stinebaugh, City of Santa Rosa Utilities Dept. Memo, July 11, 1994
17. *Watching, waiting for SR's wastewater decision,* by Mike McCoy, Press Democrat, Oct. 6, 1996, p. A8
18. *Plaintiff's Trial Brief,* by Paul and Jack Silver, Case United States District Court, #C-95-1550-SC, Russian River Watershed Protection Committee and Brenda Adelman vs. The City of Santa Rosa, June 28, 1996
19. *Plaintiff's Closing Argument,* by Paul and Jack Silver, Case United States District Court, # C-95-1550-SC, Russian River Watershed Protection Committee and Brenda Adelman vs. The City of Santa Rosa, Sept. 7, 1996
20. *Health Profile '94: The Health of Our Community,* by Public Health Dept. for the Sonoma County Board of Supervisors, pp. 4, 30, 35, 37, 43, 46, 52, 53. 54. 69, 72, 73, 94, 95

ATTACHMENT #1

RRWPC
Russian River Watershed Protection Committee

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Santa Rosa's Environmental Impact Report

Comments by RRWPC: Brenda Adelman
September 24, 1996

Introduction: 467

The analysis of this document is analogous to the blind mens' description of the elephant, none of them could see the whole animal. And so it is with this project analysis. Many different minds are providing many different pieces and none of it fuses into an homogenous whole. The organizational focus on impacts rather than on project descriptions provides a disjointed and difficult format. There is a great deal of duplication of information in the 468
various sections. We have found similar lists of toxics with slight variations in three different sections thus far. We question whether decision makers will be able to provide an adequate basis for their decision because of this document's convoluted presentation.

One of our gravest concerns is that most of the information in this document 469
was developed by computer. We wonder whether the authors of this study have even seen the Russian River; there is a remoteness from reality that leads to questions of validity. It is problematic that actual health, economic 470
and other studies were not conducted on behalf of the recipients of this waste. There are no impact studies on the tourist industry or health of people of the lower Russian River.

We are concerned that no connections are made between high rates of breast 471
cancer (1994: 20th of 58 counties in the state), a birth rate that is lower than state and national levels, increasing rates of Salmonellosis, and higher rates of giardiasis. Over the period 1988 to 1990, prostate cancer lead the cancer 472
incidence scale for men and breast cancer for women. Colorectal cancers showed a higher rate for Sonoma County than California as a whole. **In Sonoma County there were 212.6 deaths per 100,000 people from 1988-90 from all malignant tumors as opposed to 166 per 100,000 California wide for the same period.** (*Health Profile '94, The Health of Our Community*, County of Sonoma, Public Health Dept.)

The following comments represent a partial analysis of only some of the 473
major issues surrounding an increased river discharge. We intend to provide a more comprehensive analysis by Oct. 7, 1996.

Funding and capacity:

- It is a major flaw of this report that options have not included storage facilities *under* 1 billion gallons capacity. This one fact has skewed costs and made an affordable reuse option a distant dream. 474

Larger storage facilities require massive initial capital outlay which assures prohibitive cost of reclamation options and prohibits phasing. 475 Cost benefits to agriculture are eliminated and consequently to consumers as a whole. 476 Long range beneficial impacts of phasing smaller sites has been avoided. 477 Funding programs available to farmers only (thus saving ratepayer dollars) for development of ponds is unaddressed.

Support for a phased, multi-reservoir system goes back at least 20 years with the advocacy of Bill Kortum. RRWPC supports the focus on phasing and reuse as presented by SCOR. If such a phasing program had begun ten years ago, the problem would have been solved by now and millions of dollars saved. Furthermore, unlike the river, agricultural reuse has a much greater likelihood of significant future expansion. That future expansion would be far less expensive if pipeline to the South County were already in place. 478

- Plant upgrade and expansion for 5B (Laguna discharge) has already been funded and built assuring that the costs come in significantly lower than for other options and loads the deck in favor of its selection. 479 Studies have been avoided on any current practices utilized with this option. 480

- There is a lack of differenciation of the various risks and impacts between the 5%, 10%, 15%, and 20% plans for two different discharge points in most analyses. 481 The reliance on regulatory standards eliminates discussion of issues outside of the regulatory framework. (For instance, city officials refused to study possible estrogenic effects in pond fish for $33,000) 482

- An unaddressed cost issue is that increased discharges and increased regulation could ultimately force the need for a filtration system on Santa Rosa's water supply. This could cost anywhere from $100 - $150 million. Higher discharges would speed the process. John Nelson represents the water contractors of the SCWA and believes that filters would be needed if Alternative 5A were chosen. North Marin Water District has expressed serious concern about that option. 483

Discharge issues:

- In many places in the document, reference is made to the *maximum* 1% or 5% discharge *allowed by the Regional Board*. Please explain in detail how this figure is determined including actual flow data that indicates basis for release. Explain the background for this determination and 484

whether any public input was obtained. Explain 7 day averages, seasonal and yearly averages and when they are in effect and how determined. 484 485

Explain the relationship of the 5% discharge to the storage curve and precisely how that curve is determined and the exact circumstances under which higher discharges are allowed and for how long. Compare various release scenarios to actual river flows at the time discharge reaches the river. In other words, show the *true* release percentage at the confluence of Mark West Creek and the Russian River and the time in effect. 486 487 488

Show **actual** discharge percentages into Santa Rosa Creek and the Laguna de Santa Rosa and explain why you do not have actual flow data for the Laguna above and below the Santa Rosa Creek confluence other than what you estimated on the computer. 489 490

- The document does not detail current discharge calculations as allowed by the Regional Board. The seven day average effectively allows a 10-15% discharge by the time it reaches the river during times of decreasing flow. Please show how such an average would affect actual discharges and associated impacts. 491

Public comment process:

- City consultants facilitated a public comment process which was then ignored. RRWPC put forth option 2M which was a modified form of the South County option, allowing for greater conservation and urban irrigation. This option received the most support from the public input process as determined by city staff and yet was not chosen for further study. 492

A process was thereby contrived by city consultants allowing for public input which was regularly not followed. The City of Santa Rosa is well known for ignoring the recommendations of its citizen committees. 493

Fishery studies:

- Fishery studies only determined that fish were swimming through wastewater; not whether they were suffering sublethal effects from contact with the wastewater. Relatively few fish were caught; it is hard to know how many fish may have avoided the wastewater. Sublethal effects on juvenile fish are unknown. 494 495 496

- Nutrients in increased wastewater discharges are likely to raise water temperatures. This will foster increase of warm water predator species which adversely affect steelhead and salmon. In light of proposed endangered listings of the steelhead, how will this situation be remedied? 497

Water quality and toxicology issues;

- Analysis of stream bank erosion does not seem to make a cumulative analysis over time, only considers volume and velocity. Analysis does not take into account the contribution of ability of the water to transport the sediment. 498

- Assumes that water quality regulations are the basis for analysis of impacts. Concludes that additional study on environmental estrogens is necessary but that the city is not responsible for conducting such studies because regulating agencies do not as yet require it. 499

- Risk assessment is based on the probability of dose/exposure effects. Assessment does not address current concerns about synergistic effects of minute amounts (below detection in some cases) of carcinogens. It also does not address cumulative effects of the synergy. New studies are showing, for instance that a mixture of two weakly estrogenic chemicals can be far more potent than the individual compounds. 500

- According to Dr. Marion Moses, vulnerable populations are not studied in reference to pollutant exposures. "Exposures to the embryo, developing fetus, infants and children at critical periods of growth and development can have profound implications at doses which are toxicologically insignificant in an adult." 501

- The analysis of toxics in the wastewater downplays several problems and provides inadequate sampling in others. Cryptosporidium parasites are an expressed concern of city consultants as well as federal regulators yet only four samples are provided of that pathogen as well as Giardia lamblia, Legionella, Salmonella, and Shigella. This is not in proportion to the numbers of samples taken of other pollutants. USEPA is currently developing regulatory standards for this pathogen. The most recent issue of AWWA Journal is devoted to concerns about Crytosporidium. 502

- "Drinking water has been implicated as the mode of transmission in several outbreaks of cryptosporidiosis throughout the United States.....The majority of affected individuals were served by treatment plants using coagulant addition, filtration, and chlorine disinfection processes. Although treatment deficiencies and suboptimal operational practices were noted during some of the outbreaks, all treatment plants were complying with federal and local regulations. Existing regulations and water supply systems, especially those utilizing surface water sources, should be reevaluated." (*Journal AWWA*, Sept. 1996, p.77) 503

- According to toxicologist and health professional, Marc Lappe, Santa Rosa's lead levels are bordering on the very high side, silver, cyanide, 504

dissolved silver and zinc are very high, indicating possible contamination from electroplating, electronics and photo finishing industries. The Regional Plant does receive influent from many such industries. Further, he expresses concern about asbestos which is too high and for which only four samples were taken (extremely inadequate). In light of the asbestos contaminated sewer pipes that were recently illegally disposed of by city contractors, this is a very serious issue. 504(cont.)

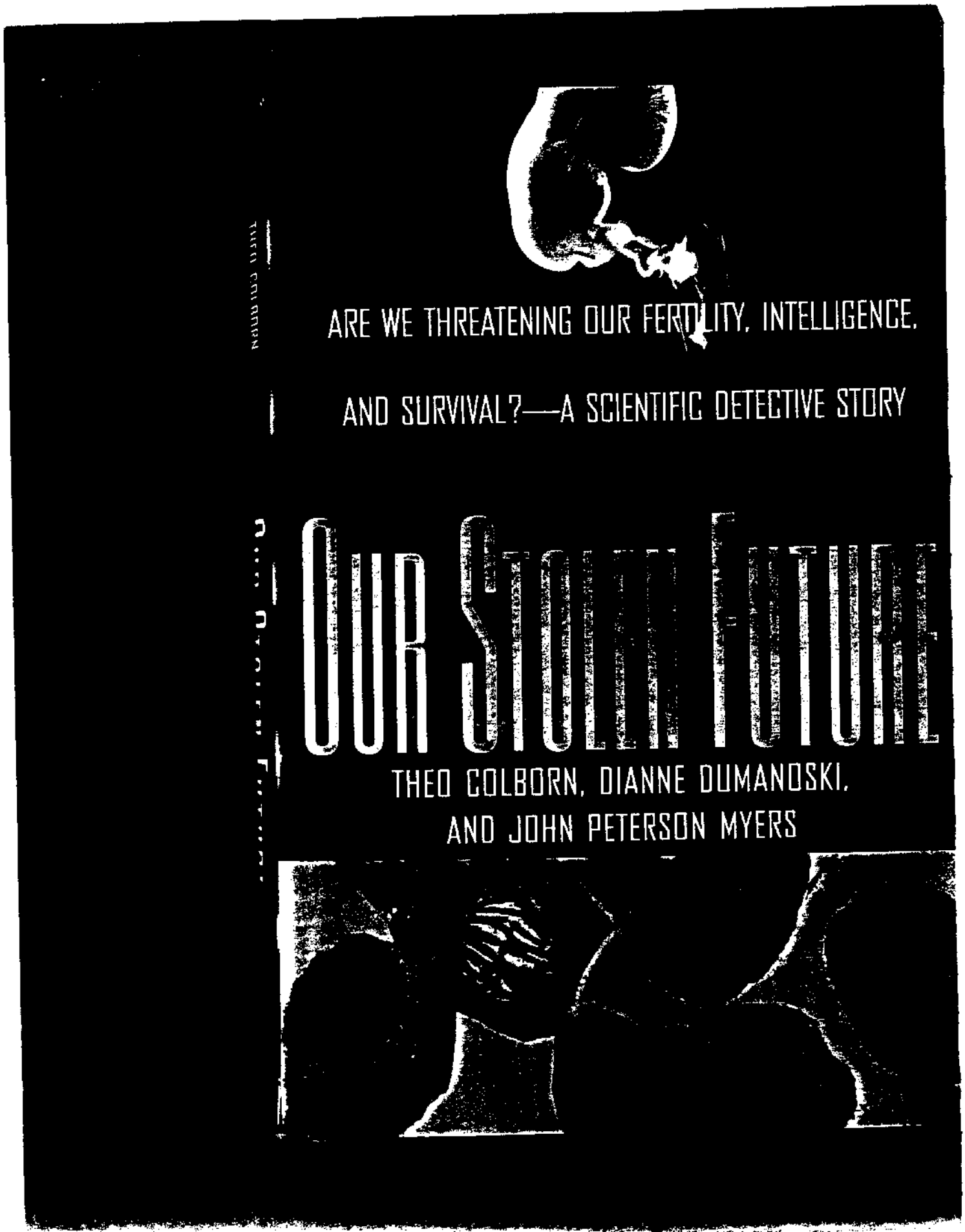
- The phthalates are xenoestrogens and carcinogens and show up in the wastewater about 20% of the samples taken. Dr. Lappe questions why more samples weren't taken; bis (2-ethylhexyl) phthalate is strongly estrogenic and needs to be monitored much more closely. These chemicals have the strong potential to disrupt the hormonal and other systems of both humans and wildlife. 505

- While heptachlor showed up only once, this is a very serious event since this chemical is a known carcinogen and banned years ago. 506 Lindane showed up almost half the time and should be much more closely monitored. 507 Nitrates are too high for human health concerns and blue baby syndrome possibilities provide serious risk. 508

Flooding Issues:

- Increased runoff from development will cause increased toxins from urban runoff. 509 Furthermore, an increase in impervious surfaces will similarly increase downstream flooding. What are the downstream impacts and costs resulting from this growth? 510

- To be continued!


ARE WE THREATENING OUR FERTILITY, INTELLIGENCE,
AND SURVIVAL?—A SCIENTIFIC DETECTIVE STORY
OUR STOLEN FUTURE
THEO COLBORN, DIANNE DUMANOSKI,
AND JOHN PETERSON MYERS

The full text of this comment has become an exhibit to the Final EIR Comments and is available by contacting the City of Santa Rosa Department of Community Development

ATTACHMENT #3

Pesticide Education Center

For a safe environment for workers and consumers

October 2, 1996

P.O. Box 420870
San Francisco, CA 94142-0870
U.S.A.

942 Market Street, Suite 409
San Francisco, California 94102

Telephone 415 391-8611
Facsimile 415 391-9159
e-mail pec@igc.apc.org

Brenda Adelman
Russian River Watershed Protection Committee
P.O. Box 501
Guerneville, CA 95446

Dear Brenda;

As you requested I have reviewed the documents from the long range EIR you sent me on plans to divert treated sewage and industrial effluent into the Russian River. 512

It always concerns me when toxics in any amount are put into ecological systems. From a public heath point of view it unquestionably increases health risks to the living creatures who rely on it for sustenance, food, recreation, and other needs and uses. 513

The document makes it clear that those who would divert contaminated toxic effluent into the Russian River are aware, or have been made aware, of public health concerns and implications. However it is not clear that they understand how these risks should be surveyed and evaluated. 514

The writers of the document emphasize several times that they are taking a "conservative approach" in their health risk assessment. Yet they use averages and not the highest level monitored in their exposure assessments. If they were truly being conservative they would rely on the highest potential exposures.

I saw nothing in the documents about any biological or health indicators. While it is important to monitor levels in water, this is only the first step. It is after all the living -- people, fish, and other creatures, that are at risk. 515 Are there any data on fish from the river? 516 Are there any data from people who rely on fish from the river for food, or any data on sports fishers, or people who live on the river? 517 518 These are important sources of biological data since health impact monitoring and assessment requires baseline data for comparison.

I also saw no mention of dibenzodioxins or dibenzofurans on any of the lists of contaminants measured. There were other chemicals on the list that would indicate there well may be such contaminants. 519

Another concern I have is that human health impacts are discussed "one chemical at a time". This fails to take into account that populations at risk are exposed to mixtures, and ignores synergistic or multiplicative effects. As you know, recent data show that chemicals that are toxicologically insignificant based on a single exposure, in combination, can increase toxicity 500 to 1000 times. We must revise our toxicological thinking -- and EPA is reconsidering how to change certain approaches to toxicity testing. This is crucial since most of the current testing is based on regulations passed decades ago and apply only to gross toxicological endpoints. 520

We must take into account the recent advances in molecular biology, genetics, immunotoxicology, and neurodevelopmental and reproductive toxicology that make the older tests insufficient as predictors of potential human health risks. The recent concern with endocrine disrupters and sperm counts is an example of these developments. 521

Another concern is the exposure of vulnerable populations. Exposures to the embryo, developing fetus, and infants and children at critical periods of growth and development can have profound implications at levels which are supposedly toxicologically insignificant. 522

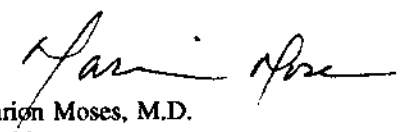
Another concern relates to testing aquatic systems for acute toxicity. While the tested species may survive, this says nothing about the degradation of the system by the toxic chemicals, and the future impacts on the progeny of surviving species. Just because it doesn't cause mortality does not mean morbidity is not occurring. 523

There are also important public health concerns related to the risk of infectious disease from bacteria, protozoa, viruses, and other agents in the effluent that would enter the river. 524

This document claims to assess health risks of a proposed toxic release policy. However, for the reasons stated, I do not feel that the risk to public health has been properly assessed. It seems that short term solutions are being proposed for long term problems. 525

I encourage you to continue your work to protect the Russian River. You are doing an important public health task. It is unfortunate that municipalities see their role as justifying toxic policies rather than eliminating them.

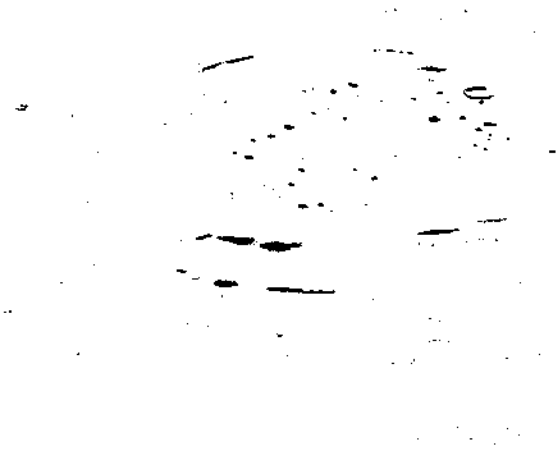
Yours for environmental health,



Marion Moses, M.D.
President

ATTACHMENT #4

A Global Decline in Microbiological Safety of Water: A Call for Action



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a report from
The American Academy of Microbiology

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